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The Webb Electric Steel Furnace

A High Voltage Unit Developed and Operated
by the Old Dominion Iron & Steel Corpora-
tion—Low Carbon Steel for Engine Bolts

BELLE ISLE, in the James River at Richmond, Va., has been the scene of interesting developments and occurrences in the history of the American iron industry. One of the oldest iron companies in the country was established there in 1830—the old Dominion Iron & Nail Works Co. Its sole article of manufacture originally was cut nails, made from puddled iron. In later years, however, it abandoned its nail plant for other purposes. During the Civil War, the island was used as a prison camp for Federal soldiers, where as many as 20,000 prisoners were kept at one time. One of the uses to which the old iron plant was put at that time was the manufacture of certain useful iron camp utensils.

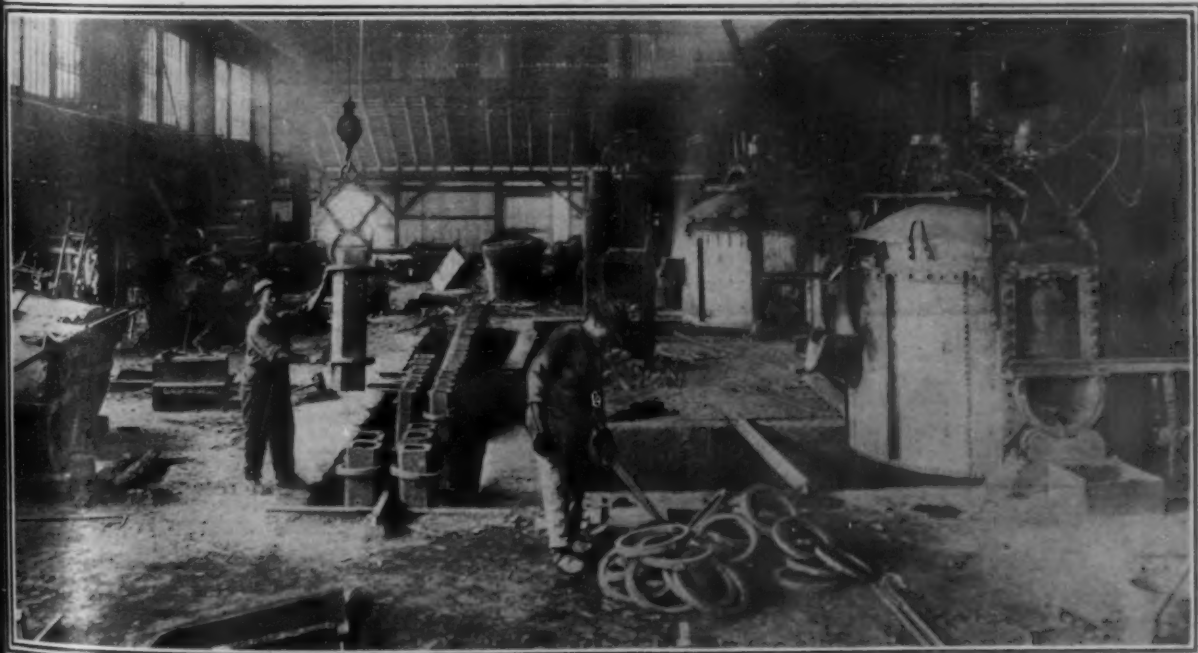
Today the two extremes of the steel industry are represented in this plant. Puddled iron is still made in quantity which is rolled into bar iron for conversion into staybolts, engine bolts, etc. Three years ago the manufacture of electric steel was undertaken and to-day a modern plant is in operation in which two electric furnaces are producing high-grade low-carbon steel which is largely converted into engine-bolt steel and horseshoe steel.

The inauguration of this department resulted in the company changing its name to the Old Dominion Iron & Steel Corporation.

Where the Power Is Obtained

Until a few years ago the machinery of the plant's various mills was driven by water wheels directly coupled, the power being derived from the falls of the James River surrounding the island. In 1915, however, a hydroelectric plant was erected, the mills moved to a new location and rearranged so as to secure the most economical results. Electric motors directly coupled to the machinery were installed. The plant consists of a puddle mill, two merchant bar mills and a horseshoe factory besides the new electric steel plant.

Because only a part of the current available from the new hydroelectric plant was needed to operate the company's mills, it was decided to use the excess energy in making electric steel. Previous to this, the company had been purchasing steel billets from which to make certain steel products. The availability of the larger supply of current led to the decision to make for its own use a grade of steel



The New Steel Plant of the Old Dominion Iron & Steel Corporation, Richmond, Va. The two Webb furnaces are on the right and back of those can be seen the transformers for the Greenwall-Dixon furnace which is in the rear right hand corner of the building

to take the place of the soft open-hearth steel it had purchased.

Development of the Webb Furnace

Contracts were accordingly let for the new steel plant and for two 5-ton electric furnaces of the arc type. These proved to be unsuited to the company's particular requirements and it was therefore decided that the company's engineers should design a furnace of its own. The result was what is known as the Webb electric furnace, the first one of which has been in operation since November, 1916, and in which over 1000 heats have been made. The aim of this article is to describe this new type of furnace.

It is an interesting fact that the first furnace, as perfected and patented by John G. Webb, was made almost wholly of materials available at the works and was built and put in operation in seven weeks. Urged by the necessity to supply the company with steel, Mr. Webb, who had had an extended experience as an electrical engineer in operating other furnaces, developed a furnace which has amply supplied the company's needs now for over two and a half years. Based upon the success of the first furnace, another one of larger capacity of the same type has been built and put in operation.

The new electric steel plant is shown in plan form by one of the illustrations. The two Webb furnaces are of 3 and 4 tons capacity respectively, and the third furnace is a 5-ton Grönwall-Dixon furnace which is still in process of installation. The three furnaces have a capacity of 75 tons of steel in 24 hr.

Principle of the Furnace Is Radical

The principle of the Webb furnace is radical. It has been the custom of engineers to design furnaces to operate on low voltages. In most cases 100 volts or thereabouts have been found best. It has, of course, been realized that if a higher voltage could be used without sacrificing good working con-

ditions and results, an advantage would be gained in the size and the consumption of electrodes, the amount of copper necessary in bus bars, etc., the adjustment of the arc, and in general a less cumbersome furnace. The fundamental principle or way in which the arc is formed or fed in transferring electrical energy to heat has not favored the use of high voltages in furnaces of familiar types, except the single-phase furnace using a single electrode, of which there are a number in operation.

The Webb furnace is supplied from a balanced 3-phase source of electricity. The voltage on the secondary side of the transformers is 280 at a maximum, but the arrangement is such that this can be reduced when it is advisable to cut down the heat at the end of a melt. A single arc is formed among three electrodes and the bath, the arc stream acting as a conductor of electricity, forming a multiple conductor with the bath or material to be melted. This effect is described in detail in the letters patent granted Mr. Webb. The arc being long, on account of the high voltage, automatic control is not found necessary. Though an advantage in some respects, automatic controls get out of adjustment and require careful attention.

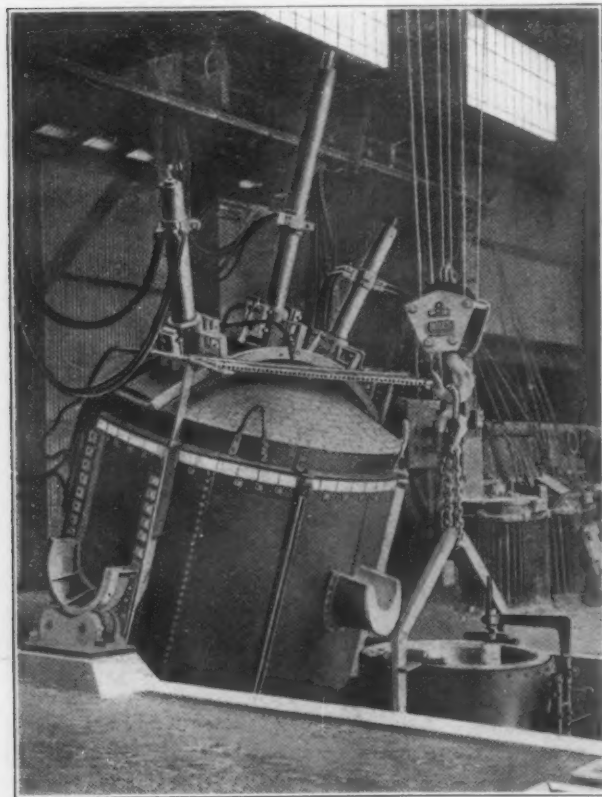
Many conditions govern the length of the arc in an electric furnace, among which are the material of which the electrodes are made, the temperature and the furnace atmosphere, but as none of these conditions are characteristic of any particular type of furnace and are a variable in all types, it may be said that the length of the arc is proportional to the voltage and inversely proportional to the current for a given power input. If one works with an arc normally 1 in. long and the electrode be moved a quarter of an inch, evidently the power input will be materially affected, but if working with an arc 6 in. long and the electrode be moved a quarter of an inch the effect will be hardly noticeable. Therefore, it is that while working with low-voltage arcs automatic control is necessary, whereas with high-voltage arcs it is not so essential.

One of the illustrations shows the original 3-ton furnace, basic lined, which makes a heat in from 2½ to 3 hr. The electrode and power consumption are extremely economical. An interesting point is that, so far as the arc is concerned, the voltage can be increased to values quite too high on account of insulating troubles, etc., and still give good operating results. For several months the furnace was run at 440 volts, using as a power supply a bank of transformers made by grouping a number of standard General Electric pole type lighting transformers.

Raw Materials and Products

Steel castings and ingots of varying and predetermined analyses have been produced commercially, using for melting scrap the turnings from munitions factories, old rails, brake shoes and miscellaneous unassorted scrap steel, iron and cast-iron accumulations, gathered from agricultural and domestic discardings from the South Atlantic states. In order to produce soft steel of first quality from scrap of such varied and unknown analyses the furnace must be basic lined and careful consideration given to every detail in refining each heat.

Pig iron has been made from turnings and borings by recarburizing the molten bath with coke and soft coal. Also ferromanganese has been reduced from the ore by melting the ore in a suitable mixture of ground coke and lime, but the furnace was not designed for these latter purposes and the



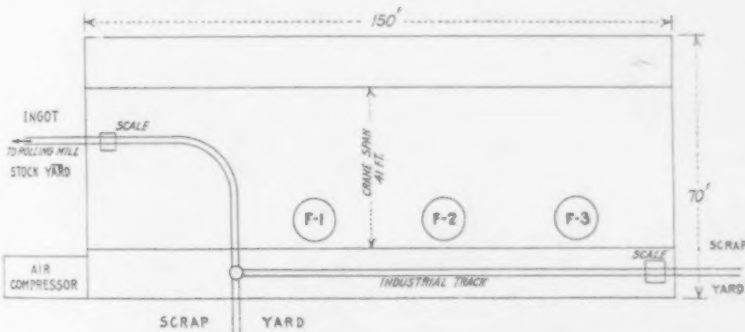
The Original 3-Ton Webb Furnace Built and Put in Operation in 7 Weeks

experiments were simply made to secure data to be made use of later on.

During the last two years the larger part of the output of this furnace has been sold to the railroads in bars of various sizes for making engine bolts. The material has been carefully inspected by representatives of buyers and has greatly exceeded in every particular the very exacting specifications of the railroads with whom the company is doing business. That the material has proved satisfactory in actual service is shown by the fact that there has been no complaint of any kind and the business has increased in volume from month to month. The chemical and physical properties of the steel required for this purpose are:

	Per Cent
Carbon	0.12
Manganese	0.50
Phosphorus	0.04
Sulphur	0.04
Tensile strength	55,000 lb. per sq. in.
Elongation in 8 in.	30% and over
Elastic limit	60% of the tensile strength
Reduction of area	50% and over

The original furnace will hold three tons and will melt and refine the charge in from 3 to 4 hr., starting with a cold furnace, and from 2¼ to 3 hr. after the furnace has produced a heat and is consequently hot when charged. The current consumption varies, likewise the time to make a heat, within reasonable limits, according to the quality of the scrap, the



The Plan of the Electric Steel Plant of the Old Dominion Iron and Steel Corporation. The two Webb furnaces are designated as F-1 and F-2, the Grönwall-Dixon furnace being F-3

luck the melter has in obtaining the desired analyses and temperature, etc. The transformers supplying the furnace are of 600 kw. normal rating. The average kilowatt hour consumption of the furnace while performing the work described is about 600 to 650. The electrode consumption, over an inventory of three months, has been as low as 5½ lb. per ton charged.

The hearth of the furnace was made by ramming ordinary sand or gravel next to the shell or bottom until thick enough to form a good heat insulator. Fire bricks were then placed on the bed of sand and run up along the sides of the furnace as far as the roof. Behind these bricks sand was loosely filled in, thus allowing for expansion of the bricks as the furnace was heated. On top of the fire bricks and along the sides to within a few inches of the slag line bauxite bricks discarded from the lining of another type of furnace were laid. Two courses of magnesite bricks formed the slag line above which silica bricks were built up to the roof, also composed of silica bricks. The bricks on the hearth were then covered with a layer of ground-up bauxite and magnesite brick bats pulverized in an ordinary tumbling barrel mixed with a little tar and rammed in tight. The furnace was then charged with 4000 lb. of shrapnel ends and turnings and the first charge melted in 6 hr. and cast an hour later. No preliminary burning-in of



The Second Webb Electric Furnace of 4 Tons Capacity. This has been operating since February, 1918

the bottom or heating of the furnace was done.

After operating from the middle of November, 1916, to the present time it has not been found necessary to replace the hearth bricks, nor to replace the fire bricks along the furnace sides. It is found necessary to patch the hearth occasionally, after a heat is poured, with a few shovelfuls of dolomite. No magnesite has ever been used in patching. This method of building a hearth is simple, inexpensive and has proved satisfactory in this instance. The silica bricks above the slag line and the roof must be renewed about once per month. The roof and electrode mechanism is lifted off with the crane and set aside, allowing the lining to cool rapidly. Sometimes air is blown against the lining with an electric fan to hasten the cooling so that another lining can be placed in the furnace.

The company has been so well pleased with the results obtained with this furnace that a second of the same type, except of 4 tons' capacity supplied

Tests of Staybolt Iron			
Elastic Limit, Lb. per sq. in.	Tensile Strength, Lb. per sq. in.	Elongation in 8 in., Per Cent	Reduction of Area, Per Cent
33,200	49,200	30.0	49.2
33,400	49,500	31.0	47.8
33,250	49,300	32.0	48.9
34,500	49,500	31.0	49.1
34,200	49,400	32.0½	50.6
34,400	50,300	30.0	48.7
35,150	50,200	32.0	48.7
33,800	50,200	32.5	51.0
34,200	50,000	33.0	50.8
Tests of Electric Engine-Bolt Steel			
Elastic Limit, Lb. per sq. in.	Tensile Strength, Lb. per sq. in.	Elongation in 8 in., Per Cent	Reduction of Area, Per Cent
39,500	58,720	31.0	53.8
39,750	59,380	31.0	54.8
40,100	60,630	30.5	55.3
43,220	63,700	30.9	51.2
39,080	56,710	31.0	57.3
41,470	59,330	28.0	57.3
42,320	59,820	29.5	58.2
40,130	59,020	32.0	60.7
38,940	53,540	30.0	64.8

from 1000-kw. transformers, has been built and has been in operation since February, 1918.

An example of the working of the Webb furnace is afforded by the following record of three

heats made on May 23, 1918, in the original furnace:

Heat	Charge, Lb.	Ingots		Kw. Hr. Per Ton	Time, Hr.
		6 x 6	7 1/2 x 7 1/2		
1	6,800	11	6	616	3 3/4
2	7,000	12	6	583	3 1/2
3	7,180	12	6	474	2

For a number of years the company has manufactured high-grade bars from puddled iron for stay bolts, engine bolts and anchor chain and it has developed a special material for this. Iron, however, while satisfactory in every other particular, has not been found altogether satisfactory for engine bolts, owing to the seamy nature of bars of large section, and for years locomotive builders

have been seeking for a similar material minus the seams. The company believes that electric steel has met the requirements.

The results of a series of tests taken from the company's records, which show the properties of the staybolt iron and the electric engine-bolt steel, are given on page 259.

The electric engine-bolt steel is all low carbon, receiving about 0.12 carbon, 0.50 manganese. The same steel is also used for horseshoe stock.

The electric steel plant has been run on low-carbon steel since it was started nearly two years ago, but it is the company's intention ultimately to make other grades of steel.

BETHLEHEM STEEL CO. PLANS

Extensive Construction Program Includes Blast Furnaces and Mills

The Bethlehem Steel Co. had, prior to the time of the entry of our country into the war, formulated and had under way an extensive construction program with a view of providing a comprehensive and well-balanced plant and equipment for the manufacture of a large and diversified line of commercial steel products at its Maryland plant, Sparrows Point. The immediate necessities of the company at the outbreak of the war for the capital demanded for the increased business required in carrying out the Government's desires for ordnance material made it necessary that this construction work for commercial steel production should be postponed. In view of this, all construction work, except such as was considered vital to the production of materials for Government use, or as was covered by existing contracts that could not be canceled, was suspended for the time being.

However, the increasing demands of the Government for commercial steel products, as distinguished from munitions, have caused the War Industries Board to urge that the Sparrows Point construction program be completed. Arrangements have been accordingly made, with the co-operation of the War Finance Board, for the financing of the completion of the projected improvements that had been laid aside. It was also the desire of the company to do everything in its power toward supplying the Government with the materials which are required in the existing emergency for shipbuilding and for other war purposes in which commercial steels are needed.

By the recent successful plan of financing, just completed, the Bethlehem Steel Co. will be enabled to go ahead at once and complete its plant at Sparrows Point. This will include the extension of ore handling facilities, including an additional 17-ton ore bridge; the completion of coal handling and storage plant, together with coal preparation plant for the coke ovens; the completion of four batteries of 60 Koppers ovens each, together with by-product plant and benzol refining plant; the erection of two additional blast furnaces with nine single gas blowing engines, gas washer, iron and cinder ladles, casting machine, etc.; the erection and installation of four 3500-kw. twin tandem gas-driven generating units, together with switchboard, apparatus, transformers, etc.; the completion of duplex Bessemer open-hearth plant with ladle and bottom house, mixers, converters, open-hearth furnaces and gas producer house; the completion of 40-in. motor-driven reversing blooming mill with strippers, soaking pits, tables, shears and accessories, in tandem with 24-in. and 18-in. continuous billet and sheet bar mills; the erection of a 60-in. universal plate mill with accessories; water pumping and supply stations, together with pipe lines and sewers; yard tracks, rolling stock and miscellaneous appurtenances consequent to the above additions and extensions to the plant.

This will make a very large construction program being undertaken by the Bethlehem Steel Corporation at this time for service to the Government, because

the Bethlehem Shipbuilding Corporation, Ltd., a subsidiary of the Bethlehem Steel Corporation, has just undertaken the construction of a 10-way shipbuilding plant at Alameda, Cal., at the request of the Emergency Fleet Corporation. This new shipbuilding plant will have 10 ship ways, and will include machine shops, fabricating shops, and all the other manufacturing units to make a complete, self-contained shipbuilding plant for the construction of large vessels.

Steel Barges on the Mississippi

Plans for the construction of a fleet of fifty steel barges and seven towboats—the first part of the Federal Government's program for the establishment of traffic on the Mississippi river on a large scale—assumed definite shape last week when A. W. Mackie, manager of the Mississippi River transportation project established offices at St. Louis. Mr. Mackie has been appointed by M. J. Sanders, president of the New Orleans Chamber of Commerce, who is general manager of the Mississippi and Warrior River transportation projects. Mr. Sanders announced at a recent conference with shippers at St. Louis that \$8,000,000 already had been made available for the project and that this was only a starter in Director General McAdoo's plans for the utilization of the inland waterways for the relief of the railroads' freight burden.

It is expected that all or the greater number of the steel barges and towboats to be used on the Mississippi will be built at St. Louis. A company is being organized for this purpose by E. A. Faust, president of the St. Louis Refrigerator Car Co.

Movement to Economize in Power Plant Fuel

In connection with the plan of the Fuel Administration to save coal in power plants, a number of bulletins on engineering phases of steam and fuel economics are about ready for printing and undoubtedly these will be obtainable for the asking. They will cover the following subjects: Boiler and furnace testing; flue gas analysis; saving steam in heating systems; boiler room accounting systems; saving steam and fuel in industrial plants; burning fine sizes of anthracite; boiler water treatment; oil burning, and stoker operation.

It will be recalled that the fuel saving plan comprehends the investigation under each State Fuel Administrator by a corps of inspectors of the general conditions existing in each coal-using power plant and that on the basis of the facts collected power plants will be given a rating so that the more wasteful will be the last to secure fuel.

Over-Way is the new trade name now being applied by the Richards-Wilcox Mfg. Co., Aurora, Ill., to its overhead carrying systems. This name will be used in connection with all types from the smallest made for shop or garage use to complete installations for large plants consisting of tracks, curves, switches, carriers, hoists, turntables, etc., for handling loads up to a maximum of 4 tons.

Rules Governing Priority Are Revised

Changes Result from Experience—Petitioners Urged to Apply the Win-the-War Test—New Regulations as to Iron and Steel Products

WASHINGTON, July 30.—A comprehensive revision of the rules and regulations governing priority in production has been completed by the Priorities Division of the War Industries Board. Numerous important changes have been made as a result of the experience of the past six months, during which the supplies of many important materials, the chief of which are iron and steel, have been so completely absorbed by Government requirements as to make preference in distribution a matter of vital consequence.

The new regulations continue in effect class AA, which comprises only emergency war work; class A, which comprises other war work; and class B, which comprises orders and work which, while not primarily designed for the prosecution of the war, are of public interest and essential to the national welfare or otherwise of exceptional importance. In order to secure rating within these three classes, application must still be made to the Priorities Committee on forms, furnished on request, save in cases where provision is made for automatic classifications, and the conditions for procuring automatic classifications have been strictly complied with.

Two fundamental changes of great importance embodied in the new regulations are: first, the addition of class D (corresponding to what was formerly class C) and the creation of class C, as a group entitled to precedence; and second, the establishment of automatic ratings governing direct Government orders and orders for materials, equipment, or supplies for certain specified purposes. These automatic classifications are of special interest to the readers of the IRON AGE, owing to the fact that iron and steel enter as materials into the production of nearly all the articles covered by the new classifications. The new regulations are as follows:

Classes Prescribed

1. All orders and work are divided into five general classes: Class AA, class A, class B, class C and class D, with subdivisions of class AA, class A and class B, indicated by suffix number, thus: Class AA-1, class AA-2, etc.; class A-1, class A-2, etc.; and class B-1, class B-2, etc.

Class AA Defined

2. Class AA comprises only emergency war work of an exceptional and urgent nature.

Class A Defined

3. Class A comprises all other war work; that is to say, orders and work necessary to carry on the war, such as arms, ammunition, destroyers, submarines, battleships, transports, merchant ships, and other watercraft, airplanes, locomotives, etc., and the materials or commodities required in the production or manufacture of same.

Class B Defined

4. Class B comprises orders and work which, while not primarily designed for the prosecution of the war, are of public interest and essential to the national welfare or otherwise of exceptional importance.

Class C Defined

5. Class C comprises all orders and work not covered by priority certificates issued by the Priorities Committee or not taking an automatic rating, in accordance with the provisions of sections 7, 8 and 9 hereof, which orders and work are to be utilized in furtherance of one or more of the purposes embraced within the "General Classification of Purposes Demanding Preference Treatment" heretofore promulgated by

the Priorities Board, as same may be from time to time amended or substituted; or which orders and work are placed by or are to be utilized in connection with an industry or plant appearing on Preference List No. 1, promulgated and published by the Priorities Board under date of April 6, 1918, and all amendments or substitutes therefor. No class C certificates shall be issued.

Class D Defined

6. Class D comprises all orders and work not embraced in class AA, class A, class B or class C, and no certificates will be issued therefor. All orders for work or materials not covered by priority certificates or not taking an automatic classification, in accordance with the provisions of sections 8 and 9 hereof, and not taking a class C classification under the provisions of section 5 hereof, will fall within class D.

Automatic Classifications

7. Each order placed after June 3, 1918, by a duly authorized officer of the War Department or of the Navy Department of the United States, or of the United States Shipping Board Emergency Fleet Corporation, which falls within class A, as defined in section 3 hereof, shall, by virtue of this rule, upon the placing of the order, automatically be classified as A-5, provided said order carries an indorsement personally signed by the officer placing the order, reading:

Unless rerated by express order in writing by the Priorities Committee of the War Industries Board, this order is by authority of said Priorities Committee rated as Class A-5, and its execution shall take precedence over all your orders and work of a lower classification to the extent necessary to insure delivery according to the date specified herein, as prescribed by Circular No. 4, issued by the Priorities Division of the War Industries Board, of date July 1, 1918, and all amendments thereto.

8. Each order for materials, equipment, or supplies for the purposes or uses hereinafter in this section mentioned shall, by virtue of this rule, automatically take a classification as herein prescribed, namely:

- (a) For the manufacture of turbines (all classes)..... A-4
- (b) For the repair or construction of steam railroad locomotives for use on the railroads under the jurisdiction of the United States Railroad Administration A-4
- (c) For the production of electrodes..... A-5
- (d) For the manufacture of rope wire and of wire rope. A-5
- (e) For the building of ships or other water craft for and under direct contracts with the United States Shipping Board Emergency Fleet Corporation.... A-5
- (f) For the building of all cargo water craft (but not pleasure craft) save such as are under construction by or for the United States Shipping Board Emergency Fleet Corporation..... A-6
- (g) For the manufacture of machine tools for working both metal and wood; of machinists' tools, of small tools, of hand tools, and of mining tools, machinery and equipment..... A-6
- (h) For the manufacture of steam railroad materials, equipment and supplies (other than locomotives) for use on the railroads under the jurisdiction of the United States Railroad Administration..... B-1
- (i) For the manufacture of locomotive cranes and traveling cranes B-1
- (j) For the manufacture of electrical equipment other than turbines (but not electrical supplies as distinguished from equipment) B-2
- (k) For the manufacture of farm implements..... B-2
- (l) For the manufacture of textile machinery..... B-2
- (m) For the manufacture of tools, implements, machinery, and equipment required for the production, harvesting, distribution, milling, canning, and refining of foods and feeds..... B-2
- (n) For the manufacture of binder twine and rope... B-2

- (c) For the manufacture of oil-well supplies or equipment—by which is meant supplies for the production of petroleum and natural gas—but not including pipe lines, storage tanks of 1000 barrels capacity or over, tank cars, or refineries..... B-2

No order shall take an automatic classification under the provisions of this section 8 save where the person intending to use the materials, equipment or supplies ordered states under oath in writing that they are to be used for one or more of the purposes mentioned in this section and for no other purpose; which affidavit shall be indorsed on or attached to the order and shall be in the form following:

Unless rerated by express order in writing by the Priorities Committee of the War Industries Board, this order is by authority of said Priorities Committee rated as Class — under and by virtue of subdivision — of section 8 of Circular No. 4 issued by the Priorities Division of the War Industries Board of date July 1, 1918, and all amendments thereto.

For the purpose of securing the said rating I do solemnly swear—

(1) That I have taken and filed whatever pledge is required by the War Industries Board from the industry of which I am a member; and

(2) That the materials, equipment or supplies covered by this order are intended for use, and will be used, for the purpose or purposes mentioned in the said subdivision or subdivisions of said section 8, and for no other purpose.

9. Each order for materials, equipment or supplies for such purposes or uses as fall within Class C as defined in section 5 hereof, will automatically be classed as Class C; provided the person intending to use the materials, equipment or supplies ordered shall file with and as a part of said order an affidavit in writing in the form following:

Unless rerated by express order in writing by the Priorities Committee of the War Industries Board, this order is by authority of said Priorities Committee rated as Class C under and by virtue of section 9 of Circular No. 4 issued by the Priorities Division of the War Industries Board of date July 1, 1918, and all amendments thereto.

For the purpose of securing the said rating I do solemnly swear—

(1) That I have taken and filed whatever pledge is required by the War Industries Board from the industry of which I am a member; and

(2) That the materials, equipment, or supplies covered by this order are intended for use, and will be used, for the purpose or purposes mentioned and referred to in section 5 of said circular, and for no other purpose.

10. Where the party placing an order under sections 7, 8 or 9 hereof conceives it to be in the public interest that the order should take a higher classification than the automatic classification prescribed herein, then in such event an application for such higher classification, setting forth the reasons therefor, may be filed and same will be considered by and promptly acted upon by the Priorities Committee. No such application should be made, however, save in cases where the automatic rating will not secure delivery on or near the date required, and such application must disclose facts evidencing that the public interest requires an earlier delivery of the order than can be secured under the existing automatic rating. The application must be made on the regular Priorities Committee application form P C 15.

Class D Orders

11. All orders save such as are automatically classed under the provisions of sections 7, 8 and 9 hereof shall be automatically classed as class D, unless covered by certificates or other written directions issued in accordance with the rules and regulations embodied in this circular or amendments thereto.

Precedence of Classes

12. Orders and work in class AA shall take precedence of orders and work in all other classes; those in class A shall take precedence of those in classes B, C and D; those in class B shall take precedence of those in classes C and D; those in class C shall take

precedence of those in class D; all irrespective of the dates the orders were placed.

Orders and work in class AA-1 shall take precedence of orders and work in class AA-2 and all lower classes; those in class A-1 shall take precedence of those in class A-2 and all lower classes; those in class B-1 shall take precedence of those in class B-2, etc., etc.

Where work is in progress on several classified orders, the rules of precedence set forth in sections 13 and 14 hereof will be observed.

Orders in Different Classes

13. The classification of an order simply means that it shall be given such precedence over orders of a lower classification as may be necessary (and only such as may be necessary) to insure delivery on the date specified in the order. It does not mean that work should cease on orders of a lower classification, or that the order should be completed and delivery made in advance of orders taking a lower classification if this is not necessary to effect delivery within the time specified. The one to whom a priority certificate is directed or with whom an order taking an automatic classification is placed should make his own production plans, so as to get the maximum of efficiency out of his operations, making all deliveries at the times contracted for, if possible, and where this is not possible, giving precedence to the orders taking the highest classification.

Orders in Same Class

14. As between orders in the same subdivision of a class (as A-1), save where otherwise specifically requested by the Committee, the date of delivery contracted for will control unless this will operate to delay the delivery required by an earlier order of the same class, in which event the earlier order will have precedence in delivery. For example: Two orders, Order X and Order Y, are both covered by A-1 certificates. Order X is dated Oct. 1, 1918, and calls for delivery Feb. 1, 1919. Order Y is dated Nov. 1, 1918, but calls for delivery Jan. 1, 1919. As between these two orders preference will ordinarily be given to Order Y, because it calls for an earlier delivery date. If, however, such delivery will delay the completion of order X, then preference should be given order X, because it is the earlier order. If possible, both orders will be completed on the delivery dates called for. The dates of the certificates are not controlling.

Doubtful Cases

15. In case of doubt as to which certificate or order should have precedence, the matter should be laid before the committee by correspondence or in conference, so that the committee may give specific instructions.

Applications

16. Applications for priority certificates must be made on the form of application prescribed by this committee.

Who May Apply

17. As a general rule, where an application is necessary, it should be made by the one intending to use the materials, equipment and supplies.

United States Government

18. If the order has been placed by some purchasing officer of the United States Army, Navy, Shipping Board Emergency Fleet Corporation, or any other branch or department of the Government, the application should be made by and in the name of the department or official for whose account the order has been placed.

Allied Governments

19. If the order has been placed for export to the territory of an allied Government or for delivery to an allied Government or to some person for account thereof, the application must be made to the committee through and with the written approval of the War Mission which is representing said Government in

the United States and also with the written approval of the Allied Purchasing Commission.

A Government Contractor

20. One who has a contract with the Government or with the Allies, and who needs priority assistance to obtain the materials, commodities, or work to fill such contract may make application direct to this committee. In some instances, the committee will have already issued a priority certificate against such contractor directing him to give priority to the filling of his Government contract or contracts. In other instances, such certificates will not have been issued. In either event, however, one who is working on Government contracts may make application direct if he needs priority assistance. While it is not necessary for such applications to be made through or with the approval of the Government official placing the contract, it is desirable that this course should be pursued where it will not involve substantial delay. Where this course is not pursued, such applicant's connection with the Government work and the correctness of his representations will be verified and checked by the committee.

Government Subcontractors

21. Those who may be one or more times removed from a direct contractor with the Government or with the Allies, but who are furnishing materials, supplies, or commodities to be used in connection with the fulfillment of such direct contract, may make application direct to the committee for such assistance as they may need to obtain such materials, commodities or supplies. Such applications need not be approved by either the principal contractor or by the agency of the Government or the Allies placing the original order, but the representations of the applicant will be verified by the committee.

Applicants Not Engaged Directly or Remotely on Government Contracts

22. One who has placed an order for any material, commodities or supplies which fall within class B, as defined in section 4 hereof, and who requires priority assistance to procure reasonably prompt delivery thereof, may make application direct to the committee. In such cases the paragraphs in the application seeking to elicit information with respect to the applicant's connection with the Government or Allied contracts may be disregarded.

Against Whom Applications May Be Made

23. Applications for priority should be made against the actual producer or manufacturer. The committee will not—save in exceptional cases, where the issuance of a certificate will clearly expedite the filling of an important order—administer priority against jobbers, brokers or middlemen.

Premature Deliveries

24. In placing orders, care should be exercised in determining the date that delivery will actually be required. The contractor should not ask to have delivery made before he will be prepared to use the articles. A rigid adherence to this rule will greatly facilitate timely deliveries of urgent orders and prevent needless interference. The application must state the date of delivery promised by the producer.

Priority Certificates

25. When the committee shall approve an application and give it a rating, it will issue a priority certificate. The one to whom the certificate shall be directed will, in fulfilling the contract or order mentioned in the certificate, give to it such precedence or priority as it may be entitled to under the classification specified in the certificate and the rules of this circular.

Priority Classifications Supersede Other Instructions

26. Priority classifications, whether evidenced by certificates or automatic ratings as prescribed in sections 7, 8 and 9 hereof, shall supersede any and all

previous instructions, by whomsoever issued, with respect to priority in production and delivery of the contract or order covered thereby, except commandeering orders and special priority directions issued in pursuance of section 28 hereof.

Execution of Certificates

27. Certificates or other documents signed by order of the Priorities Committee (printed) and countersigned in person by any person whose name appears thereon as one of the persons authorized to countersign shall be deemed to have been authorized by said committee, the Priorities Commissioner, and the War Industries Board.

Special Priority Directions

28. That unusual emergencies may be promptly met and cases of great urgency provided for, the Priorities Committee may, by an order in the form of a letter, a special certificate or otherwise, signed personally by the Priorities Commissioner, direct that a particular contract or order shall have priority over other contracts or orders covered by existing certificates or automatic ratings, or may in the same manner reclassify or regrade existing contracts or orders covered by outstanding certificates or automatic ratings.

Delivery of Certificates

29. Unless requested to the contrary, the Priorities Committee will forward direct to the applicant the original and one copy of the certificate, if issued, that the applicant may send the original to the one to whom it is directed, retaining the copy for his files. If the applicant desires, and so expressly states, the certificates, if issued, will be forwarded to the one to whom directed. Should the committee decline to approve the application, prompt notification of such action will be sent direct to the applicant.

Scope of Work

30. The committee undertakes where necessary to administer priority in the production of all raw materials and finished products save foods, feeds and fuels.

Fuel

31. The production, supply and distribution of fuel is under the supervision of the United States Fuel Administrator, who, in the distribution of fuel to industries and plants, is guided by the preference list in so far as it classifies such industries and plants according to their relative importance. The preference list is compiled and promulgated by the Priorities Board, of which the Priorities Commissioner is chairman and H. G. Phillips is secretary. While the Priorities Committee does not administer priority in the production of fuel, should those engaged on orders covered by priority certificates, automatic classifications or special priority directions experience difficulty in securing a fuel supply to the extent of interfering with the production covered by such priority, they may apply for a place on the Preference List on application form PL-1, which will be furnished to them by H. G. Phillips, secretary, on request. Such applications will be investigated and appropriate recommendations will be made to the Fuel Administrator, to the end that all orders to which this committee has accorded priority in production may not be unnecessarily delayed for lack of fuel.

The committee will also consider applications by fuel producers for priority assistance to procure materials, tools, equipment or supplies required for the production of fuel.

Foods and Feeds Excluded

32. The committee does not distribute foods or feeds, over the production, supply and distribution of which the United States Food Administrator has supervision. The committee, however, will consider applications from producers of foods and feeds for priority assistance to procure materials, tools, equipment or supplies required for their production.

Transportation

33. This committee does not administer priority in transportation. The United States Railroad Adminis-

tration in furnishing transportation service is guided by the preference list mentioned in section 31 hereof, defining the relative importance of industries and plants. Should those engaged on orders covered by priority certificates, automatic classifications or special priority directions experience difficulty in arranging for the transportation of materials, equipment or supplies to the extent of interfering with the production of said orders, representations to this effect addressed to the Manager of Inland Traffic, War Industries Board, Washington, setting forth such facts in detail, duly verified by affidavit, will be carefully considered and in proper cases certified to the United States Railroad Administration to the end that all orders to which this committee has accorded priority in production may not be unnecessarily delayed for lack of transportation. Special application forms for this purpose may be secured from the Manager of Inland Traffic, War Industries Board.

This committee will also consider applications of transportation companies for priority assistance to procure materials, equipment or supplies required in their operations.

Export and Import Licenses Excluded

34. The committee does not issue export or import licenses. All applications for such licenses should be addressed to the War Trade Board, Washington.

Prices and Purchases Excluded

35. The committee does not fix or assist in fixing prices. Neither does it make or assist in making purchases.

Regrading of Schedules

36. When it appears that a large per cent of the capacity of any plant is covered by certificates or automatic ratings of the same subdivision of a class, the Priorities Committee will, when it appears desirable so to do, arrange, through conference between it, the authorized representative of such plant, and those placing the orders covered by such certificates or automatic ratings, for the reclassification thereof or the rearrangement and regrading of the schedules within each subdivision of a class, so as to insure the most urgent orders having precedence without unnecessarily interfering with the efficient management and operation of such plant.

Attention is called by the Priorities Committee to the fact that save in very exceptional cases priority assistance is only required where the demand exceeds the supply. This is now the case with regard to so many leading commodities, however, that the new regulations are of vital interest to practically every important industry. In outlining the principle upon which priority will be administered, the committee says:

The paramount purpose of priorities is the selective mobilization of the products of the soil, the mines, and the factories for direct and indirect war needs in such a way as will most effectually contribute toward winning the war. In requesting priority, the petitioner should join with the committee in applying the test: To what extent, if at all, will the granting of this application contribute, directly or indirectly, toward winning the war; and if at all, how urgent is the need?

Vigorous denials are entered by the United States Shipping Board of reports attributed to German propaganda, and described as "furtive stories to the effect that more men are being killed and injured in our shipyards than in the trenches." The Department of Labor statistics show that the accident rate in shipyards from 1912 to 1916 is approximately 21.8 for every 1000 men. It will be noted that these figures cover a period previous to the enlarged shipbuilding activities in this country. At Hog Island, which has been built and organized from nothing, the average force of men in May was 20,497. The number of accidents which caused loss of time was 107, which gives a frequency rate of 6 as compared with the rate of 21.8 for the period from 1912 to 1916.

DECLARED UNWORKABLE

Employers Dissatisfied with Decision in Controversy at Waynesboro, Pa.

WASHINGTON, July 30.—The National War Labor Board has rejected an appeal from a group of manufacturers in Waynesboro, Pa., for a review of the board's recent decision in the controversy between the employers and workers in eight metal manufacturing plants in that city, a decision that fixed a new wage scale far in advance of the demands of several classes of the men involved, and included an increase of nearly 100 per cent in the rate paid for common labor. The board gave as its reason for refusing to hear the employers that they had not put the decision into effect.

According to a statement made by the War Labor Board, its decision granted a general increase in wages to all of the workers, 3000 in number, and ordered that a system of collective bargaining be established and that an administrator be sent to see that the award was enforced. This representative of the board, Stiles P. Jones, has reported that "the men are prepared to cooperate with him in every way, have accepted the decision in toto, and are anxious to come together with the employers on some plan for its administration." The employers, however, complained against the award on the ground that it was unworkable, opposing in particular that clause in which 40 cents was fixed as the minimum hourly wage to be paid to any employee in any classification, including the common laborer. Pay for common laborers up to date has gone as low as 22 cents an hour. They refused to meet with representatives of the men to develop a plan for giving effect to the award. Mr. Jones reported also that the situation has led to a feeling of unrest among the men that threatens to culminate in a repetition of the strike which brought the case first to the attention of the board.

When Mr. Jones' report was received by the board, according to the announcement made by its secretary, the following motion was offered by Loyal A. Osborne, vice-president of the Westinghouse Electric & Mfg. Co., and was unanimously adopted:

"I move that it is the sense of the board that inasmuch as the manufacturers in Waynesboro agreed to abide by the decision of the board, and the decision having been made, we expect the decision to be put into effect. We are not willing to give any further hearings in the matter pending the putting into operation of the decision."

The board also ordered that Mr. Jones be instructed to go to Waynesboro at once, taking with him assistants properly qualified to put the award into full force and effect, and report to the full board, at as early a moment as possible, the result of communicating to both employers and employees the action of the board this morning and of notifying them that there will be no further interposition by the full board until the award is put into effect.

The concerns affected by the award are the Frick Co.; Emerson-Brantingham Co.; Landis Tool Co.; Landis Machine Co.; Bostick-Lyons Bronze Co.; Shearer Machine Co.; Victor Tool Co. and the Cashman Tool Co. One of these companies, the Bostick-Lyons Bronze Co., did comply with the award in every particular. The others did not. Explaining the allegation of unworkability, the employers stated that they could not work out a proper system of classification on the basis of the award. In order that they might be assisted in working out such a system and still abide by the award, the board has authorized the employment of a technical assistant to advise with both sides.

The Connellsville Foundry, Machine & Steel Castings Co., iron and steel castings and special machinery, has discontinued the sales office formerly maintained at 901 Park Building, Pittsburgh. All correspondence regarding orders should be addressed to the general office at Connellsville, Pa.

BAND MUSIC IN SHOP CAFETERIA

Energy of Workmen Is Stimulated and Saloon Patronage Cut Down

Music during the lunch hour in a manufacturing plant is an innovation that has been tried out by the Cincinnati Milling Machine Co., and has proved successful in attracting employees to its general dining room. Some time ago a shop band was organized, and it now numbers 26 pieces. At noon each day this band entertains the diners in the restaurant with both popular and so-called classical selections. The half hour devoted to this work is donated to the employees by the company, as the members of the band are allowed their full shop time.

In addition to attracting the employees to the dining room for lunch a noticeable improvement in the zest that the workmen display in resuming their afternoon labor has been reported from all departments.

The restaurant is conducted on the self-service method, and is operated directly under a shop committee appointed by the men. The company furnished

The Beneficial Effect of Music Supplied By the Shop Band at This Plant Cafeteria Has Been Quickly Reflected by the Zest With Which the Workers Start the Afternoon Task and in the Reduced Saloon Patronage. The stage and lunch counter are at opposite ends of the dining room. The single row of seats permits easy passage.

he is extended a welcome to eat it in the dining room, where he is provided with salt and pepper and ice water.

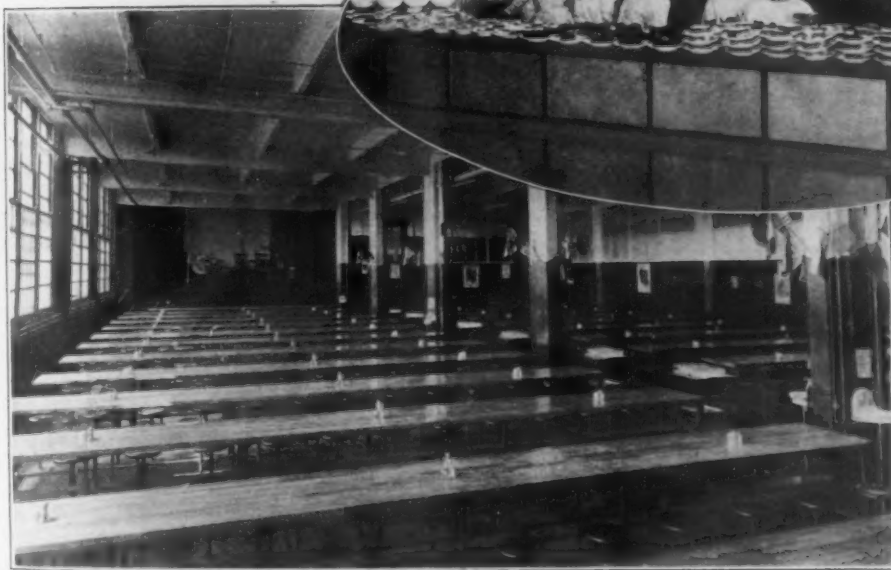
A small refrigerating plant is operated in conjunction with the kitchen, so that all eatables are kept in good condition until served.

The cash system is used entirely, and it was found to be more satisfactory than issuing coupon books, which was tried out when the restaurant was first established. In this way there is an absolute check on the income for each day, and the system reduces book-keeping to a minimum.

In addition to the noonday lunch a meal is served at 5 p. m. for the night force and still another at 11.30 p. m. At both music is furnished by a Victrola or a piano player. Hot coffee is served free of charge to the workmen in the shop at 2 a. m.

Republic's Second Quarter

The Republic Iron & Steel Co.'s report of operations for the second quarter of the current year shows net earnings of \$3,675,444, compared with \$3,527,730 in the first quarter. Compared with the correspond-



ing quarter of 1917, the statement shows a falling off in net of approximately \$4,000,000.

The balance available for dividends on the common stock for the three months' period was \$2,568,272, compared with \$2,584,269 in the preceding quarter. These figures are after deductions for maintenance and repairs amounting to \$1,188,168, and provision for the excess profits taxes. A statement issued

by the company said that the directors had authorized a deduction from net profits for the quarter of an amount in excess of that required by existing tax laws as a provision for increased excess profits taxes suggested by pending legislation.

A compilation made from the quarterly reports of the company shows that net earnings in the six months ended July 30 last aggregated \$7,203,174, a decrease of \$7,411,350, compared with the corresponding period of 1917. Net profits were \$6,027,540, equal to \$18.94 a share on the common stock for the six months' period, against \$38.99 a share in the corresponding period of 1917.

Unfilled orders on the books of the company on June 30 last amounted to 299,737 tons, compared with 421,021 tons on March 31.

Formerly the workmen were compelled to either bring their own lunches or to patronize the saloons or small restaurants in the vicinity of the plant. As will be noted from the prices given above they are able to obtain food, of a much better quality and prepared in an appetizing way, at a much cheaper rate than they could get it on the outside. Another advantage in patronizing the shop restaurant is in the arrangement for prompt service, about 550 persons being passed through to the dining room with their trays containing the food selected, within an average period of 9 min. This is accomplished by having three cash registers, the operators of which have an assistant at hand who calls out the amount due from each diner.

Should a workman desire to bring his own lunch,

The Bureau of Mines, Department of the Interior, has issued a publication giving analyses of coals from many hundred mines in the United States. Copies of the bulletin, No. 123, which is for the industries that require large quantities of coal, may be obtained free of charge by addressing the director of the Bureau of Mines, Washington.

Causes of Defects in Steel Ingots*

Benefit of Lime in Acid Open-Hearth Slags and the Saving of Manganese —Temperature and Speed of Pouring

BY J. N. KILBY

IT is generally accepted that the important factors having to do with the influence of casting in relation to cracks in the ingot or bar are:

Temperature of the steel at casting.

Speed with which the mold is filled.

Other yet lesser factors are:

Whether the ingot is bottom or top-poured.

Size and weight of the ingot.

Cross-sectional area compared with length.

Composition of the steel.

Weight of steel to be cast from the ladle.

Temperature of the Steel

Different opinions still exist as to the present value of pyrometry in controlling the furnace product. In November last this variance of opinion was obvious at a gathering of experts upon the subject (Faraday Society). I give here some views upon the matter, which at the least do not agree.

Mr. Service thought I relied too much upon what he termed "experience and eye method." The opinion of Mr. Service is very interesting when compared with the following extract from Mr. Cosmo Johns' paper, published in the *Iron and Coal Trades Review* for Nov. 16, 1917:

"It was found that a skilled observer could, with the aid of blue glasses, from observations of the steel as it is poured from the furnace into the ladle, estimate differences of possibly 10 deg., and certainly 15 deg., apparent temperature; while men, watching the pouring of the steel from the ladle into the molds, where the increased viscosity, due to decreased temperature and other factors, rendered possible a greater precision in the estimate, could certainly distinguish differences of 10 deg. apparent temperature. Any pyrometer adopted must therefore be capable of giving consistent readings with greater precision than 10 deg. As a matter of fact, a trained observer can, with a suitable instrument, obtain readings with a variation of 2.5 deg. under very favorable conditions, and this degree of accuracy is more than sufficient for effective control of the metallurgical processes employed. For each class of steel it is only necessary to determine—for the particular casting method employed—the 'normal' temperature when the steel is tapped from the furnace, which gives the best result. This 'normal' may vary as the process employed is modified. The measurements involved are therefore divergences from the particular 'normal' adopted at the time, and as the range of variations in regular practice is small, no appreciable error is introduced by considering the differences in the pyrometer readings as temperature differences. The desirable temperature varies 10 deg. apparent from the normal, and a very high percentage of the casts does not appreciably exceed these limits. Temperature variations of 20 deg. apparent give rise to serious difficulties, and 15 deg. apparent can be considered to be the variation admitted in practice. These limits are for special steels; they are wider for ordinary commercial steels."

Dr. Rogers, in his criticism of my last paper in May, says "that a good deal could be done with the aid of pyrometers, but that he had not found them to be sufficient in themselves, and that his own efforts in the direction of inventing a pyrometer to overcome the limitations involved were not as yet completely successful."

*From a paper presented at the May meeting of the Iron and Steel Institute in London, May 2, 1918.

At the September meeting of 1916 (*THE IRON AGE*, Oct. 12, 1916, and Dec. 7, 1916) and the May meeting of 1917 (*THE IRON AGE*, July 5, 1917) of the Institute, papers were presented by the author dealing with defects found in steel ingots or in the article manufactured. Papers upon the same subject have also been read before the Sheffield Society of Engineers and Metallurgists and the Staffordshire Iron and Steel Institute. The present paper contains some of the matter given in the two last papers, coupled with further observations and results.

When one speaks of casting temperatures, the terms hot or mild are purely relative to the product desired, though they are often used without full regard to accuracy. For instance, a cast alleged to be on the hot side may produce ingots free from cracks, provided the period of filling be prolonged to the correct extent by using correct sized nozzles, or secondary ladles, or, when bottom-casting, putting down a sufficiently large number of ingot molds per bed. Further, a cast alleged to be on the cool side will most certainly yield ingots which will crack at cogging, if they have been teemed relatively quickly.

Speed of Teeming

Teeming speed is really of greater importance than temperature, taking the variation from one cast to another to be within usual everyday practice, and omitting exceptional cases of hot steel caused by careless manipulation. Of all trades and processes the steel trade stands first in its dependency upon the personal equation and it appears to be one compromise after another.

Argument upon casting temperatures would lead one to suppose that the difference in degrees of heat was extremely great. Experience proves that this difference, coupled with the factor of safety, is not great. The casting of heat after heat with a slight skull left behind, at the same time getting cracked ingots in the mill or forge, points to the great importance of correct teeming speed per ingot. Speaking of casting temperatures and skulls, a case occurs to my mind of the principal of a firm who insisted upon the necessity of cool steel, asking for confirmatory evidence in the form of a certain minimum weight of skull (5 cwt.) each time. After numerous too successful attempts at the weight desired (very often resulting in the loss of the entire cast) someone discovered that, by ramming or bricking the ladle bottom in a direction sloping away from the nozzle, a skull of a consistent weight could be obtained every time, even on the warmest of casts, but all casts were thereafter accepted as cool.

Bottom-Cast Steel

The objects achieved by bottom casting are:

Better surface of ingot.

Less splash.

Freedom from cracks during working.

The first two items are generally obtained, but the third is dependent upon factors already detailed. There are a good many objections to bottom casting, the danger of the extraneous inclusions being far greater than is the case in top casting. It is possible to cast groups of ingots from the same heat and have a number of them work well while others will be very badly cracked. By casting through varying sized nozzles or varying weight per bed, one may easily obtain great differences in the actual time required to fill each ingot. The time factor governs the first formation of solid steel, and decides whether the later contraction will crack the ingot or not. The steel should not fill the mold in too free a manner, but should tend to scum over and gradually and evenly form a thin cover of semi-solid steel from the bottom to the top as the filling proceeds.

Cheese tires amply prove this. I found that in casting 480-lb. cheese tires the percentages of defects were as follows:

$\frac{3}{4}$ minute	.....All cracked under press
1 minute	.....50 per cent cracked under press
$1\frac{1}{4}$ minute	.....25 per cent cracked under press
$1\frac{1}{2}$ minute	.....5 per cent cracked under press
$1\frac{3}{4}$ minute	.....2 per cent cracked under press
2 minute and over	.....None

Again, with regard to tire steel, where ingots are sliced into blocks and afterwards, varying results may be obtained upon the selfsame ingot, due to erratic teeming, as indicated by Fig. 1.

Regarding the base or bottom portion of any bottom-poured ingot (where a good percentage of defects will show, if visible anywhere), it is important not to rush the first foot of the ingot during teeming.

Variation in the teeming speed either in the individual groups of ingots, in a cast, or from one cast to another, is therefore to be brought to a minimum. There is a definite time per ton for any mold: above this time no cracks result, but below it trouble begins, in spite of cool steel. The logical conclusions to be deduced are: that the pitman must be in such a position that he cannot possibly teem too quickly, and that the speed must be such as to be safe, yet so regulated that the cast can be successfully dealt with.

Where slow teeming depends entirely upon stopper manipulation erratic results are certain.

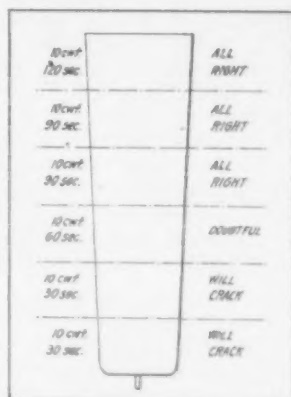


Fig. 1—Three-Ton Ingot to Be Cut Up for Tire Blocks. Total teeming time, 7 minutes. Top half, passable; bottom half sure to crack. (Where nozzle full stream exceeds capacity of ingot.)

As shown, the time varies for each 10-cwt. portion and would result in defects according to time taken for each portion, accounting for a number of bad blocks in individual ingots.

Top-Poured Steel

Certain classes of steel are cast to advantage by being top poured. Such material is always freer from extraneous inclusions and shows fewer defects from this cause when the ultimate article has to be machined and closely scrutinized. The compensating disadvantage, however, of top pouring is the greater liability of obtaining cracked ingots. In many cases no regard is paid to the actual time taken in filling the molds or finding the speed most conducive to correct results.

Speed in filling the molds is the most important factor at any time in the process of steel-making. Provided that the speed of a top-poured ingot compares equally with a bottom-poured one, similar in size, corresponding results can be obtained as far as freedom from cracks or rokes are concerned. When top pouring, the flow of the steel tends to force any particles of extraneous matter to the sides of the ingot, thus making a purely surface defect, as compared with an embedded one in the case of bottom pouring.

When taking teeming times the period should commence from the moment the steel enters the mold to the instant that feeding, as it is termed, takes place. Two ingots may be teemed, the total time being equally divided between them, yet one may be sound and the other may work badly. The reason for this is that the time taken by the latter may have been spent, not in casting the ingot proper, but in feeding the last portion. The smaller the ingot the greater the comparative necessity of top pouring correctly.

It is somewhat striking to note the differences one finds in teeming speeds, for a given weight, at different works. For the same quality of steel in a 65-cwt. ingot, teeming times varying from one minute up to ten minutes for the whole ingot have been noted.

Dr. Burgess, in his communication on Brearley's paper,* gives his time for teeming a 7200-lb. ingot as one minute. Taking a similar ingot my experience is that, when teemed under three minutes, 80 per cent will show cracks at rolling, the safety line actually being six minutes.

Bottom-poured steel cast at too low a temperature or too slow a speed tends to cause lappiness, or folds, in the ingot. Ordinary carbon steels do not suffer much from this condition for the reason that, should the steel be so cool as to lap badly, the chances are much against the mold filling at all.

Chrome, high-silicon and vanadium steels are always subject to lappiness in a more or less degree. The appearance of the ingot will give some idea whether this lappiness is going to be a serious defect or not. If the teeming is so slow as to allow the steel to form a solid cake or cover, through which it afterwards bursts (and this frequently occurs in this class of steel), the result will be sufficiently serious to attract notice later, when machining. The formation of oxide films on the surface of such slowly cast ingots tends to give fine elongated seams or pockets when the steel is rolled. The use of pitch, ground as fine as flour, in the mold as the steel rises, must necessarily help to minimize the danger, as also the tarring of the mold. An ingot scumming over too quickly will clean itself with a minute proportion of such pitch.†

It is evident, therefore, that in the case of some steels there is a minimum rate below which the teeming must not drop.

The use of comparatively large nozzles in the ladle and a small weight per bed lead to what I term spasmodic teeming, the stream from the ladle running at full force being of greater volume than is compatible with the correct filling of the molds. In these cases the teemer has to use his discretion and endeavor to control the stream so as to fill the molds correctly. Often the result is an ingot teemed in widely varying speeds and lapped in a good many places, the stream being often momentarily cut off.

Effect of Lime in Acid Slags

In the May paper of 1917 a number of charts were given along with certain facts illustrating the effect of lime upon slag composition and the resultant physical conditions of the acid open-hearth process. It was my argument, based upon analyses and records, obtained from different works, and extending over a period of more than 10 years, that the use of limestone or similarly constituted basic material was highly essential to the success of the process. That, with a slag containing certain percentages of lime, the danger of slag inclusion resulting from retained oxides, silicates, etc., was to a large extent minimized, at any rate, as far as furnace control could go. Further, that this was brought about by the lime slag being in a perfect state of flux, thus yielding more intimate contact with the steel, and a state of receptivity for such undesir-

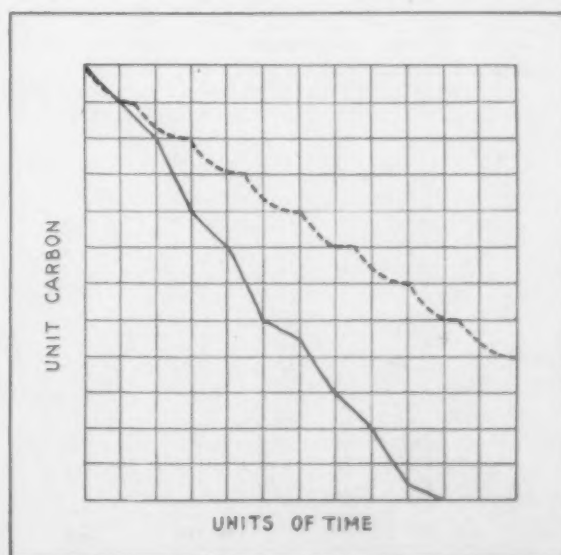


Fig. 2—The Lower Curve Represents the Use of Insufficient Lime or None at All and Shows the Erratic Fall in Carbon and Consequent Variable Conditions at Finishing. The upper curve represents conditions where the slag contains throughout the correct percentage of lime, showing correct bath condition at any period of the boil.

*Journal of the Iron and Steel Institute, 1916, No. II, p. 180.

†The use of anthracite for this purpose is fraught with great danger and should never be resorted to.

able inclusions referred to. Reference was also made to the control of carbon elimination.

Fig. 2 shows two curves. In the bottom curve (the charge without CaO) it will be noted that the fall in carbon is erratic and for a given time varies greatly. The bath at any stage would not be in a reliable condition, and naturally such heats usually vary in the finished results as far as analysis goes, apart from the other and greater evil of doubtful steel. In the top curve, where CaO has been introduced from the beginning and maintained throughout the process, the carbon elimination is more regular, and a charge could be tapped almost at any period without fear of very wrong results analytically. Consistent results from finishing material added are more readily obtained.

Saving of Manganese

Where large losses of manganese take place at the finishing stages, one may suspect bad cases of the trouble in question, that is, slag inclusions. The influence of CaO upon the manganese yield is very marked. Including all variables, particularly the time factor, and basing the figures given upon data extending over a huge number of casts, the relationship may be described thus:

The yield of manganese obtained in the steel in the bath, from added ferroalloys, all variables considered, is proportionate to the CaO per cent (or its equivalent of similar basic material) in the slag. See Fig. 3.

Fig. 3 shows that the manganese yield obtained increases with the CaO per cent in the slag. The curve is derived from the results of average casts, with varying CaO per cent. The difference as shown is about 20 per cent, or in the actual figures 0.18 per cent manganese. In establishing the records identical conditions (excepting CaO content) were aimed at, the time factor receiving the greatest care. I was shown some interesting figures recently, proving how defects due to slag inclusions in certain classes of ingots ran in the inverse ratio to the loss of manganese in the bath, or corresponding increase on MnO in the slag. There was naturally a decrease in the FeO present. The dominant feature governing the whole was, without doubt, the CaO per cent in the slag at tapping.

Dead melting, so often referred to, can be obtained at any period of the process after boiling, if the two factors, of available silicon and silica of the charge, and that of lime content of the slag, are duly considered and worked to. The slag or refining medium of the process is almost purely a product of the metals, metalloids and their oxidation during melting and working, and as a consequence it is liable to vary somewhat according to the constituents of the charge and the time requisite to reduce the mass to the molten state. Consistent and reliable results, therefore, would

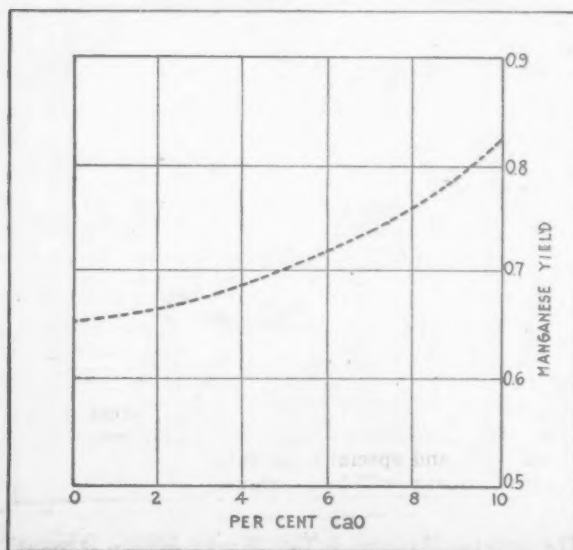


Fig. 3—Relationship Between Mn Yield Into the Steel and the Percentage of CaO in the Slag. All varying factors, of course, being considered

not accrue unless some basis is aimed at to fulfil the functions most desirable. The fact that material is made and passes specification, ignoring the above, is not argument against its adoption.

Standardization is surely essential where so much depends upon the personal element of the workman. Material of just as good quality can be made with only moderate percentages of pig iron in the charge, providing the ruling factors are fully appreciated; also, the use of high percentages of pig iron does not necessarily overcome the difficulty of over-oxidization. The shortage of pig iron, and the necessity of drawing from the dump scrap-heap, point to the advisability of adopting some means of control of regular melting. Works possessing unlimited supply of good scrap are not so badly placed as those dependent upon any possible source of outside supply.

Quantity of Lime in Acid Steel Making

There is still some difference of opinion about the use of such basic material as CaO or MgO in the acid open-hearth process, as well as the quantity to add and the periods at which such additions should be made. From results obtained, I contend that 8 per cent to 10 per cent in the case of CaO, and rather less where MgO is used, say, 6 per cent to 8 per cent, are productive of best results. MgO appears to be keener in its functions than CaO. The effect in each case, however, I believe to be similar. The periods to add were given in the May paper, also some of the reasons why.

The principal aim of the use of CaO is not to thin the slag. As the diagrams showed, it is a decided advantage to add the main portion of the CaO any time after boiling or even at melting, excepting, of course, the occurrence of some other abnormal condition preventing its use. The accepted benefit of the use of CaO at the end of the process confirms my argument as to its earlier values. The functions of CaO are:

To enable the FeO present in the slag to react upon the carbon in the bath, by virtue of its intimacy, physically, due to the perfect state of flux the slag assumes.

Whether the charge is just melted, boiling, or at any stage, the addition of CaO immediately affects the composition of the slag in similar degree and tends to remove excess oxides.

That the point contended of slag alteration, and the immediate decrease of FeO in the slag, produce a more absorbent medium for any extraneous matter present in the steel.

That CaO is not added to thin the slag.

Elimination of Impurities

The elimination of any element or compound impurity from the metal into the slag or flux of almost any metallurgical refining process depends upon the temperature, and the receptivity of such slag or flux for such impurity. Furthermore, the last traces of impurity are usually most difficult of removal. Consider for a moment, that in the case of particles of included matter in the steel, the loss of defective material through this cause is, comparatively speaking, only a very small proportion by weight. In the case of the acid open-hearth also let us consider that we are trying to remove traces of compounds somewhat similarly constituted chemically to the envelope by which the molten metal is surrounded. Reference is made here to the sectional diagram of the acid open-hearth bath, Fig. 4. When new the hearth proper is composed, or should be composed, of semi-fused SiO₂ plus small percentages of oxides of alumina and iron. This assumes before charging the appearance of an almost white semi-glassy mass. In this condition it is in a highly absorbent state, and continues to take from the charge a large amount of oxides (not metallic matter) until the bottom becomes satisfied or completely impregnated. By this means the hearth becomes a most important source of influence upon the working of the steel and its ultimate composition, and possesses some relationship to certain classes of defects. There is a stage, usually after the first few heats, when the hearth, satisfied with oxides, reverses to

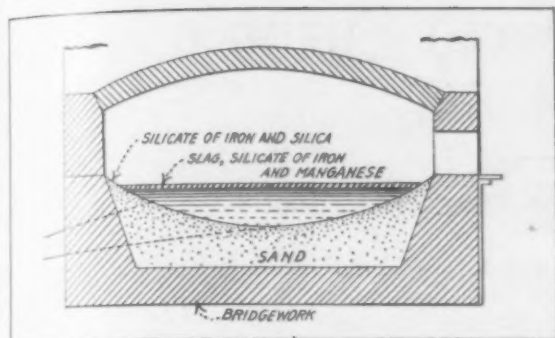


Fig. 4—Section of Acid-Lined Open-Hearth Furnace

some degree the action, relieving minute particles of non-metallic matter which are taken into the steel. The elimination of any such matter can only be effected through the absorbing properties of the slag, at least in so far as furnace operations are concerned. The composition of the slag, and its physical state, must therefore be so constituted as to aim at this desired and necessary form.

Thus far I have dealt with oxides formed during melting or introduced during boiling, and their possible elimination, by means of the slag influence upon them. Under good conditions, however, an appreciable residual amount not removable in the furnace remains in the steel. Commercially we may have steels termed free from the evil which in point of fact are not. The amount present in such instances is insufficient to affect tests, or the speed of solidification and size of the ingots and the requirements of the manufactured article do not reveal but tend to hide its presence. Small ingots retain the inclusion disseminated fairly evenly throughout the mass, the chilling effect of the mold preventing liquation of the particles. In the case of large ingots the reverse is experienced. A cheese tire ingot, for example, is subject to what I may term direct chilling solidification, or in other words, the mold influence outweighs the heat above freezing point possessed by the steel in the mold. Taking such an ingot, weighing only a few hundredweights, and comparing it with one weighing about 25 tons, the actual time of solidification in the former case is in minutes, and in the latter many hours. We find, therefore, that weight and cross-sectional area of the ingots have their own particular influences upon the locality of the inclusions.

The article to be manufactured and the processes through which it passes are important points bearing upon the subject. With small forgings or stampings in special steels, or highest grade wire, every few pounds of the whole cast is put practically to close physical and other tests, while close machining also tends to reveal defects of minute proportions yet sufficient to cause rejection and failure.

The inevitable residual slag inclusions found in the ingot and not removable in the furnace present a difficulty worthy of overcoming. To cast the steel in such a manner as to bring the whole in direct contact with some absorbent flux either in the ladle or a secondary ladle, or in the mold, would possibly prove a successful course. Some essential basic fluxes have great affinity for oxides and silicates of iron, manganese and aluminum, and the contact of the steel with such during the process of casting would certainly be at the least partially successful. It will be often noted, when casting steel by the tun-dish method, that a good deal of extraneous matter rises to the surface of the steel, due to giving up of matter previously held in suspension. The experiments made in the direction named give incentive to more investigation.

The McKinney Steel Co., Cleveland, is erecting four additional open-hearth furnaces of 65 ton capacity and two more soaking pits. With these additions the company will have 16 open-hearth furnaces.

Rapidly Equipping the Army

WASHINGTON, July 30.—The United States has passed the two billion mark in the manufacture of small arms ammunition, according to an official statement from the Ordnance Department. Since this country entered the war, and up to and including July 19, 1918, the total output of cartridges for rifles, pistols, revolvers and machine guns, inspected and accepted, was 2,014,815,584. The daily average output is approximately 15,000,000. The maximum number inspected and accepted in a single day was 29,466,000 on July 5.

The latest figures available on the production of small arms, including rifles, pistols, revolvers and machine guns, inspected and accepted, are up to and including July 13, 1918. They show:

Total number of rifles of all types.....	1,886,769
Total number of pistols, Model 1917.....	217,000
Total number of revolvers, Model 1917.....	169,367

Machine gun output is now mounting rapidly. Official figures show a total manufactured, inspected and accepted, up to July 13, 1918, of 82,540. During the week of July 13 the production of all types was 6681 guns, a gain of 1564 over the previous week's output. This increase is cumulative, and in a short time production is expected to exceed 10,000 per week.

The manufacture of Browning machine guns has been on a quantity basis for several weeks, and up to the present time aggregates 10,204 light guns and 5959 heavy guns. During the week ending July 13, 1918 light and 1075 heavy Brownings were completed, inspected and accepted.

Service tests of the Browning gun, especially of the light type, bear out all the claims that have been made for this remarkable weapon as a gun to be carried by the first-line troops in trench warfare, or in offensive movements in the open. The light weight of the gun, which makes it possible to handle it as a shoulder rifle, together with the perfect functioning of the magazine, give the men who carry it a marked advantage over troops armed either with shoulder rifles or with the heavier types of machine guns used in the German army.

Record Exports of Tungsten and Vanadium Alloys

Exports of ferrovanadium and of tungsten continue to attain record proportions. The April exports of ferrovanadium were 146,946 lb., bringing the total for the 10 months ended April 30 to 2,031,600 lb. as compared with 2,100,712 lb. for the 10 months ended April 30, 1917, and only 772,271 lb. for the corresponding period ended April 30, 1916. The exports of ferrotungsten and tungsten metal were 435,846 lb. in April, this year, with the total for the 10 months ended April 30, 1918, at 2,086,274 lb., as contrasted with 1,148,442 lb. to April 30, 1917. As showing how these exports have grown because of the war the following table is interesting:

Exports of Ferrovanadium and Tungsten in Pounds.		
Year	Ferrovanadium	Ferrotungsten and Tungsten
1917	2,430,424	2,211,303
1916	2,031,027	574,321
1915	840,265	
1914	770,079	
1913	604,287	

Exports of tungsten previous to 1916 were negligible, Germany being the largest exporter previous to the war.

The Welsmore Mfg. Co. has been purchased by the Detroit Reamer & Tool Co., 302 Congress Street, East, Detroit. The manufacture of high speed reamers, cutters, end mills and special tools formerly made by the Welsmore company will be continued.

The General Machine & Tool Works, maker of wood and metal patterns and stampings, is now located at Cedar Rapids, Iowa.

Silica Brick in Open-Hearth Furnace Roofs*

Deterioration as Observed by French Authorities—Rôle of Iron Oxide and Lime in Their Manufacture—Composition After Use in Roofs

TESTS on the effect of various mineral fluxes liable to be used as agglomerants in the manufacture of silica bricks have revealed the surprising fact that appreciable quantities of iron oxide do not sensibly lower the fusion point of SiO_2 , even in the presence of CaO , according to a paper presented by M. Bied to the Paris Académie des Sciences, and published in the *Comptes-Rendus* of May 13, 1918, vol. 166, No. 19, pp. 776 to 778. Cylindrical test bars were made from various mixtures of raw materials and measured 50 mm. in diameter and 30 mm. in height. Molded by compression in cast-iron molds, they were fired at a temperature estimated by comparison with Seger cones. The first fluxing compounds tested were soluble sodium salts, then alkali-bearing clays, particularly glauconite which is a ferri-potassic silicate. While attempting to substitute for glauconite mixtures of Fe_2O_3 and alkalis, then Fe_2O_3 and CaO , the small influence of iron upon the fusion point of the sample bricks was revealed.

In a first experiment a mixture of 75 parts of sand from the Piolenc quarries and 25 parts of roasted pyrites showed, after firing them in an experimental kiln for an hour at 1500 deg. C. an expansion of 4 per cent, the test cylinders being in perfect condition. The same mixture, but agglomerated with a 43 deg.-Be. sodium silicate solution (soluble glass), when fired under the same conditions, was completely fused down.

Assuming the Piolenc sand (98 per cent SiO_2) to have a fusion point of 1750 deg. C., it will be seen that this temperature is not lowered, on the average, 10 deg. C., through the addition of 1 per cent Fe_2O_3 . With a view to determine whether CaO (calcined limestone) in the presence of Fe_2O_3 , had a similar deleterious effect, comparative experiments were conducted with the two following batches, one of which analyzed about 2 per cent CaO , and the other the same proportion of Na_2O :

	I	II
Sand from Piolenc.....	91	91
Roasted pyrites	9	9
Calcined limestone	4	..
Sodium silicate (syrupy solution).....	..	10

After firing for an hour at 1500 deg. C. the first mixture gave a normal, sharp-edged brick, with an expansion of 3.8 per cent. The second mixture displayed incipient vitrification, the expansion amounting only to 0.8 per cent.

A second series of test bricks was prepared with varying proportions of iron oxides and lime:

	I	II	III	IV	V	VI
Quartz (from Souvigny)...	100	100	100	100	100	100
Roasted pyrites	3	3	4	4	5	5
Calcined limestone	0	2	0	2	0	4
Expansion (firing at 1450 deg. C.), per cent.....	3.8	3.0	4.0	2.0	4.0	3.0
Additional expansion (firing at 1700 deg. C.), per cent.	4.0	2.8	1.8	4.4	1.8	3.0

Iron oxides alone have no agglomerating effect, since they impede the formation of the tridymite network, which makes it necessary to associate them with CaO . The influence of a mixture of Fe_2O_3 and CaO upon the fusion point was also determined, with the following results:

Quartz (from Souvigny)	100	100
Roasted iron pyrites.....	3	..
Limestone	3	2
Fusion point	1725 deg. C.	1730 deg. C.

A high-quality brick of German manufacture ("Stella" brand) showed signs of fusion at 1730 deg. C. under the same conditions. Both test bricks and Seger cones were considered fused when the apex of the pyramid was sufficiently bent down to touch the refractory support.

It will thus be seen that an addition of 3 per cent Fe_2O_3 and 1 per cent CaO lowers the fusion point only

5 deg. C.—an interval which hardly falls beyond the experimental error. A brick made from the ferruginous mixture, which was held for several days in a crucible-steel furnace at about 1600 deg. C., showed an expansion of 1.8 per cent, but otherwise was perfectly uninjured. Photographs show that after this period of heating the individual quartz grains had entirely disappeared as if "dissolved" in the mass, thus raising the fusion point by a fresh supply of unattacked silica.

Composition of Bricks from Roofs of Furnaces

The composition of silica bricks taken from the roofs of basic open-hearth furnaces has been the subject matter of another paper presented by E. Rengade to the Académie des Sciences of Paris, on May 13, 1918. (*Comptes-Rendus*, 1918, vol. 166, No. 19, pp. 779 to 781). An examination of these bricks shows them to have undergone severe alterations. It is known that the most important ones are due to the conversion, under the influence of high temperatures, of quartz into cristobalite, then into tridymite, as originally investigated by H. Le Chatelier, and also more recently in collaboration with Bogitsch (*Comptes-Rendus* 1890, vol. 111, p. 123; 1916, vol. 163, p. 948; 1917, vol. 165, p. 218).

A subsidiary object of the investigation was the chemical modification to which the bricks are subjected under the influence of the dust particles floating in the atmosphere of an open-hearth furnace. Four different zones can be distinguished in these bricks.

A. The lower layer immediately in contact with the flames is glazed and frequently shows protuberances depending downwardly (stalactites) and of variable lengths. The coloration of a freshly broken surface is a light grey and the mass has a perfectly homogeneous aspect and frequently is dotted with blowholes.

B. Above this zone and generally very sharply separated therefrom, follows a black or dark-gray zone, likewise having a very homogeneous aspect and a very considerable crushing strength.

C. A transition zone which, most frequently, is indicated by the appearance of white specks in the middle portion of the black zone (No. 2) which are the original thicker quartz grains not completely absorbed. The black zone then merges into a pale brown zone in which the heterogenous structure of the original brick again becomes visible and which appears as if only impregnated with a fused substance having a brown coloration.

D. The uppermost layer of the brick did not undergo any detectable alteration.

The microscopic examination, in polarized light, of thin sections cut from the 4 aforesaid zones reveals in Zone B the frequently described structure composed of large transparent tridymite crystals; the joints between these crystals are filled with a black, opaque substance. In Zone A it is noticed that tridymite has undergone actual fusion, the large crystals being replaced here by spherules surrounded by, but not mixed with, the black opaque constituent. On cooling, the molten tridymite changes into cristobalite and, in some places, forms birefringent regions of badly developed tridymite. In Zone C the large tridymite crystals continue to appear, but gradually diminishing in size and numbers according as the less heated sections are approached, until in Zone D the normal structure of the original brick is again encountered. On analysis of the composition of the four zones, the results in the tables were obtained.

It will be seen that Zones A and B contain greatly varying and sometimes very considerable amounts of iron. The state of oxidation is likewise subject to variations, but very near to Fe_2O_3 . Zones A are frequently, but not always, higher in iron than the corresponding Zone B which fact may be explained by ad-

*Translated abstracts made by E. C. Buck.

Brick from Acid Open-Hearth Furnaces, Composition of Zones in Per Cent

	No. 1		No. 3		No. 2				No. 5			
	A	B	A	B	A	B	C	D	A	B	C	D
SiO ₂	90.30	87.00	94.30	94.80	79.60	74.76	91.00	95.30	93.60	94.60	93.80	97.50
Al ₂ O ₃ .....	..	0.60	0.90	0.50	0.80	1.10	2.70	1.10	0.50	0.40	1.70	0.60
CaO	1.20	2.50	1.30	1.15	0.10	0.30	3.35	1.90	0.25	0.80	3.15	1.40
MgO	Trace	Trace	Trace	Trace	Trace	Trace	0.05	Trace	Trace	Trace	0.04	Trace
FeO	0.87	0.51	0.08	0.44	5.73	4.47	..	..	1.12	0.36	..	..
Fe ₂ O ₃	6.21	8.44	2.97	2.96	13.62	19.03	2.51	1.27	4.50	3.81	1.37	0.43
Mn ₂ O ₃	0.73	1.32	0.24	0.25	0.29	0.23	0.19	0.20	0.18	0.14	0.20	0.20
Total Fe	100.21	100.37	99.79	100.10	100.14	99.94	99.80	99.67	100.15	100.11	100.26	100.13
Fe in another brick from the same furnace	5.02	6.30	2.14	2.42	14.00	16.80	1.75	0.88	4.02	2.95	0.96	0.30
	..	..	10.61	5.20	4.35	4.35	..	..	6.43	7.18	..	..

Brick from Basic Open-Hearth Furnaces, Composition of Zones in Per Cent.

	No. 6		No. 9				No. 10			
	A	B	A	B	C	D	A	B	C	D
SiO ₂	89.00	84.30	89.00	88.80	91.00	97.30	This zone missing	88.20	83.80	95.70
Al ₂ O ₃	0.70	0.90	0.80	0.70	1.80	0.70		0.60	1.30	0.50
CaO	2.00	3.40	3.90	3.85	4.20	1.15		1.90	6.30	2.00
MgO	0.20	0.20	0.65	0.72	0.10	Trace		0.20	0.10	0.12
FeO	1.44	2.57	0.75	0.50	..	..		2.18	1.28	..
Fe ₂ O ₃	5.30	7.65	3.59	4.39	2.56	0.48		6.43	6.29	1.71
Mn ₂ O ₃	0.77	1.04	1.11	1.00	0.52	0.14		0.65	1.02	Trace
Total Fe	99.41	100.06	99.80	99.96	100.18	99.77		100.16	100.09	100.03
Fe in another brick from the same furnace	4.84	7.35	3.09	3.47	2.02	0.38		6.20	5.40	1.20
	3.21	6.81	..	..	..	..		..	..	..

mitting that the black ferruginous constituent not mixed with the silicious constituent in the fused Zone A, is drawn into B by capillarity to fill the gaps between the tridymite crystals. Likewise, it seems as if the CaO in the brick travels by capillarity in the state of a fusible silicate which impregnates the entire Zone C, at the expense of Zones A and B, which thus become impoverished with regard to CaO (in acid open-hearth furnaces).

The grey and black colorations of A and B, respectively, have no direct relation with the iron content but are due to the fact that the large tridymite crystals in Zone B are highly transparent, whereas the troubled structure of SiO₂ in Zone A renders it translucent. A remarkable fact is that the fusibility of the bricks is not sensibly affected by very high percentages of Fe₂O₃, according to direct experiments and the actually observed excellent behavior of those most impregnated in the furnace.

Effect of Floating Particles of Iron Oxide

The fluxing effect of minute particles of Fe₂O₃ floating in the atmosphere of an open-hearth furnace in which the ore-process of steel manufacture is carried out, has been investigated by Prof. H. Le Chatelier, in collaboration with B. Bogitsch, and a condensed report read before the Académie des Sciences of Paris on May 13, 1918 (*Comptes-Rendus*, 1918, vol. 166, pp. 764 to 769). This investigation corroborates that made by Rengade (see above) and the same conclusion is arrived at: That the penetration of iron oxide into the interior of the brick is due to capillary migration. On placing upon a piece of silica brick impregnated with iron oxides a thick paste made from finely powdered silica brick, but containing no iron, and heating for an hour at 1600 deg. C., it will be noticed that the coloration of the new brick has risen to a height of about 5 mm. This penetration of iron oxides is much more pronounced in a reducing atmosphere. A pellet of compressed iron oxides weighing 1 gram, when placed on top of a silica brick and heated to 1200 deg. C. provokes the formation in the brick of a depression conforming exactly in diameter and volume to the iron oxide pellet. The iron silicate formed diffuses downwardly into the body of the brick. The same experiment, but carried out in an oxidizing medium, gives no cavity up to a temperature of 1400 deg. C., the pellet resting intact upon the surface of the brick.

The diminution of the proportion of basic oxide in the portion directly heated by the furnace flames is due to the contraction of the brick, the porosity gradually becoming smaller whereby the ferruginous slag is expelled, causing it to rise into the less heated layers. A small experimental brick cut from the dark brown zone of an old brick, which is composed of large tridymite crystals, uniformly encased in the black ferruginous flux, suffered shrinkage to the extent of 5 per

cent after heating it for one hour at 1600 deg. C. The original brick, free from iron oxides, when heated under similar conditions, expanded about 5 per cent as a result of the conversion of quartz into a modification of silica of low density. This shrinkage increases with time and, simultaneously, the tridymite crystals continue to grow in size.

This shrinkage can be readily observed on bricks under actual furnace conditions, at least as long as they have not undergone fusion on their exposed surface, which latter shows a small layer having the shape of the original brick, but whose dimensions are smaller by 10 per cent. This layer finally becomes detached (spalling) whereby deterioration of the brick is instigated, although this form of disintegration is extremely slow. Until then only semi-fusion has occurred. In the case of complete fusion the brick body starts to flow, giving rise to the well-known stalactites which remain suspended from the furnace roof, provided heating was slowed down in time; if not, the bricks finally melt away altogether, thereby causing drop of the entire furnace roof.

Metallic iron, when placed upon the surface of a brick, causes formation of deep holes therein both in a reducing and oxidizing atmosphere, since in all cases the first degree of oxidation of the iron is the protoxide which combines at once with the silica. This explains why the gas and air ports upon which small droplets of molten iron are projected during the refining process are gradually corroded. These droplets are too heavy to rise to the furnace roof. A gradual impoverishment in CaO of the superficial layer and a corresponding increase of the CaO-content of the upper layers has also been noticed by the authors. The iron silicates, on ascending further into the brick body proper, drive before them the silica-aluminates of CaO pre-existing in the brick and used as flux during the burning stage of their manufacture.

The same phenomenon has been reproduced on a laboratory scale by taking a test bar cut from a new brick and placing it vertically upon a slab of iron oxide heated to 1600 deg. C. After one hour the repartition of the CaO in various zones of the brick was as follows:

	Per Cent
Original brick	2.07
Zone marked by infiltration of Fe ₂ O ₃	2.45
Zone immediately in contact with the free oxide	0.88

The height of capillary ascension of Fe₂O₃ was only about 20 mm. Instead of heating only for one hour, heating is prolonged for weeks and months, the distance the iron oxide travels is correspondingly greater, and accordingly the volume of the brick "washed" by the iron oxide being also greater, the enrichment of the uppermost zones with CaO is also the more pronounced. This enrichment is the more important the higher the rate of destruction of the brick, since, the cross-sectional area of each zone being then smaller, the relative

concentration of its CaO must be higher. This conclusion is in accordance with the experimental results given above.

This accumulation of CaO in the middle zones is of great practical interest. A mass containing about 5 per cent of CaO, as, for instance, Zone C of the bricks investigated by the authors, has its fusion point near 1600 deg. C, whereas Zone A of the same brick has its fusion point at 1700 deg. C. If, as a result of excessive heating conditions, the temperature of 1700 deg. C. is momentarily exceeded, and the superficial layer is fused away, the layer immediately following the latter, being suddenly brought into contact with the flame before the capillary functions have had time to impoverish it in basic oxides, will necessarily be brought to fusion in turn. Thus, in a few minutes, a brick may lose one half of its weight in material. A silica brick impregnated with iron oxide is thus in a sort of unstable equilibrium; more severe furnace conditions (with regard to temperature) are sufficient to cause a disaster. This is one of the reasons why the manipulation of a basic open-hearth furnace is so delicate an operation.

Coking Coal Land Delivered to H. C. Frick Coke Co.

UNIONTOWN, PA., July 29.—Liquidation of J. V. Thompson's vast estate, composed of coal holdings in Fayette, Greene and Washington counties and West Virginia, was commenced this week with the distribution of \$7,000,000 to mortgage creditors from the proceeds of the Frick deal involving 12,000 acres of coal of the highest quality located in Cumberland and Jefferson townships, Greene County, with a frontage on the Monongahela river. The final consummation of the deal is the first tangible result of moment secured since the financial crash of January, 1915, when the First National Bank, of which Mr. Thompson was president, closed its doors.

Following two years of litigation, the deed for the coking coal was delivered Thursday in Pittsburgh to the H. C. Frick Coke Co. Distribution was immediately commenced, and before the week ends the entire proceeds will be in the hands of the mortgage creditors and other coal holders associated in the transaction. The largest payment was made to the Citizens' Savings & Trust Co. and the Union Trust Co., both of Cleveland, upon the J. R. Nutt mortgage for \$2,003,881. The Nutt mortgage covered 7000 acres of the Thompson property, of which 4000 acres were involved in the sale to the H. C. Frick Coke Co.

Mr. Thompson's trustees in bankruptcy, together with representatives of the Frick company and of J. G. Butler, Jr., of Youngstown, Ohio, who took the options on the field, were in Waynesburg this week and made payments to the mortgage holders in Greene County.

Consummation of the Frick deal and virtual assurance that the Hill deal, which involves the purchase of Mr. Thompson's holdings in their entirety by a group of St. Paul and New York capitalists, has started activity in Greene County coal fields. A transaction was consummated last week for the transfer of 941 acres of coal lands and 121 acres of surface to Robert Hobson and Francis Henry Whitton of Hamilton, Ont. The block was sold by the Western Coke Co., Pittsburgh, for \$670,000, or at \$700 per acre. The property is located along South Ten Mile Creek, between Jefferson and Waynesburg. A deal is now pending for the sale of 5000 acres of "back" coal in Franklin and Whitely townships by the trustees in bankruptcy to C. G. Rockwell of Chicago, representing a Chicago syndicate and several other deals of magnitude, it has been learned from authoritative sources, are in the making.

The Youngstown Foundry & Machine Co., Youngstown, Ohio, builders of rolling mill and steel works machinery, states that it has bought a 10-acre site at Girard, Ohio, and intends some time in the future to build a new plant, or remove its present plant to Girard. However, nothing will be done in the building of a new plant until the war is over.

Motor Cars Selected for Government Use

WASHINGTON, July 30.—The standardization of cargo trucks and passenger automobiles for the use of the Army has been completed, and more than 75,000 trucks and cars have been ordered. Four types of trucks and three of passenger cars have been selected.

The $\frac{3}{4}$ to 1-ton truck selected is the G. M. C. truck, now known as Army type AA. Changes have been made in the model used by the Government, the principal change being in the spring development. About 7500 of these trucks have been ordered. The $1\frac{1}{2}$ to 2-ton truck selected, now known as Army type A, is the White. In the 3 to 5-ton class, the specially constructed Army truck of this class, known as type B, was selected. There had been 18,000 of these trucks ordered, the first 10,000 to be completed by Sept. 1, and the remainder by Jan. 1, 1919. The cost of this truck was less than that of any of the others, the cost of the combined spare parts being identical with the cost of the chassis complete.

For about a year the engineering division of the Ordnance Department has been working on an improved 4-wheel drive type of truck. This truck is known as Army type TT, as it is really a tractor truck. It is especially suitable for the hauling of great guns over rough stretches of road or over open country. In many ways it has the ability of a tank to go over places generally considered impassable to vehicles. It is one of the distinct contributions of automotive engineers to the war.

In rejecting many trucks, the examiners stated that in no way was their act a reflection on the commercial value of these vehicles. The majority of trucks are made for city work, and as army trucks are called upon to do exceptionally heavy, rough work, commercial trucks could not stand up under the strain.

On account of the request from the American Expeditionary Forces for additional Ford machines, the Ford chassis was adopted as a standard for use of the Army to be used as a passenger car, light truck, light ambulance and for whatever else desired. There are already approximately 3000 ambulances of this type in use in France. Under recent request of General Pershing this will be increased to about 8000 and the Ford company is now working on an order for 5000 light delivery trucks, production of which began July 22 at the rate of 200 per day.

Two other types of passenger cars have been selected for the use of the Army. In connection with the adoption of the passenger cars, it was found after exhaustive tests that the chassis as now being manufactured for the Army by the Dodge and Cadillac companies were best adaptable to Army needs. These are not the models now being marketed by these concerns, but a type with certain additions and deductions. These are to be produced in other factories if the needs of the Government require.

Jones & Laughlin By-Product Plant

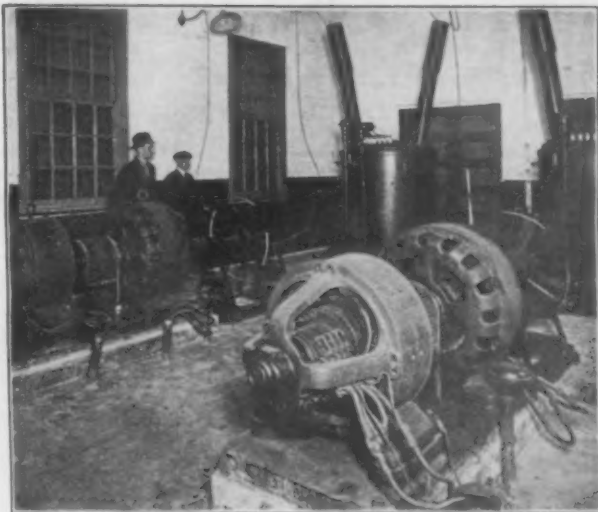
The Jones & Laughlin Steel Co., Pittsburgh, which is building 300 Koppers by-product coke ovens near its Eliza blast furnaces in Pittsburgh, has applied for building permits for structures to be erected in connection with the new ovens, as follows: One-story brick and steel boiler house, 46 x 300 ft., to cost \$163,000; two 3-story brick and concrete coal bins, 75 x 42 ft., to cost \$100,000; a one-story brick and steel benzol building, 56 x 113 ft., to cost \$42,000; a one-story brick and steel machine shop, 80 x 109 ft., to cost \$29,000; a one-story brick and steel pump and still building, 38 x 119 ft., to cost \$20,000; a one-story brick office and laboratory, 86 x 34 ft., to cost \$13,000; a one-story brick and steel storage building, 44 x 172 ft., to cost \$8,000; a one-story brick and steel naphthalene building, 31 x 62 ft., to cost \$5,000; a one-story brick and steel service water pump house, 23 x 67 ft., to cost \$6,000, and a one-story loading dock building, 22 x 39 ft., to cost \$3,000. The property on which the buildings will be erected was acquired by the company during the past few months, at a reported expenditure of about \$400,000.

Electrical Precipitation from Flue Gas

An interesting application of the reclaiming of solid and liquid particles from flue gases by the use of electricity has recently been made in a large copper refinery. The gases are passed through tubes in which chains charged with high voltage direct current are suspended. The particles carried by the gases in passing through the tubes become electrified and are projected against the walls of the tubes which are grounded and the particles thus drop into hoppers below. Another feature is the size of the generating and transforming units employed.

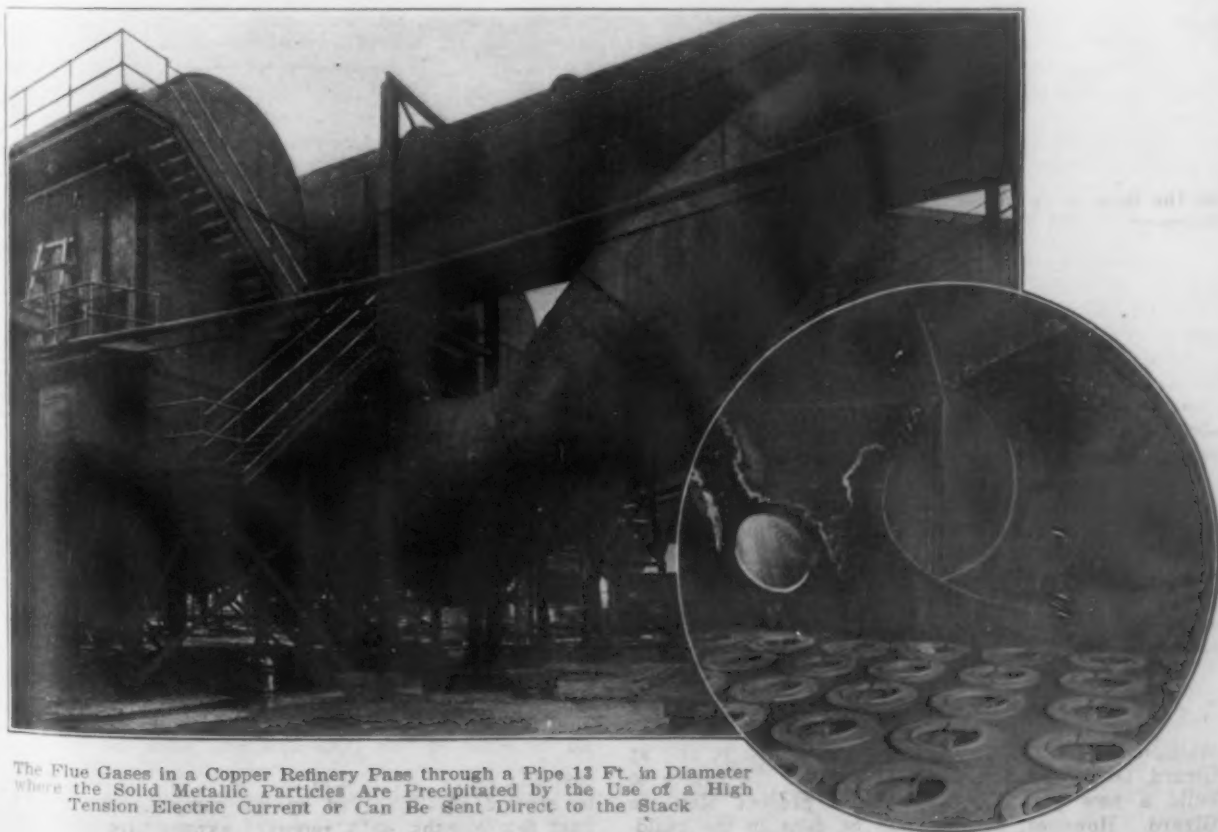
The generating equipment installed consists of two 40-kva. 60-cycle single-phase Westinghouse generators operating at 1800 r.p.m. and delivering current at a potential of 150 to 250 volts. A direct-current power line supplies the excitation current required by the generators which are driven by 50-hp. 230-volt direct-current motors. Only one unit is used ordinarily, the second set having been installed for emergencies. The employment of a single unit for handling all the current required is directly opposite to the general practice in plants of this type where the electrical equipment is split up into a number of small units. From the generator the current is led to a 40-kva. transformer which steps up the current from 200 to 100,000 volts. In addition to the maximum voltage taps are provided to give voltages of 50,000, 62,500, 75,000 and 87,500, the full capacity of the transformer being available on each tap. The voltage of the high tension direct current must be varied according to the condition of the flue gases being treated. This variation is provided by the transformer taps, supplemented by the voltage adjustment of the generator. The high tension leads of the transformer pass out through condenser-type bushings made of alternate layers of metal foil and insulating material which, it is explained, give a relatively high degree of insulation in a small diameter. Choke coils located inside the transformers are relied upon to smooth out the static surges which are apt to occur on the high tension line from time to time.

From the high tension secondary of the transformer, the current passes through rectifiers coupled to the



The 40-Kva. Motor-Generator Set Delivers Current at 200 Volts to the Transformer, where It Is Stepped Up to a Potential of 100,000 Volts before Going to the Electrodes in the Flue Gas Treater

shafts of the motor-generator sets where it is transformed into high tension direct current. The tubes containing the high tension electrodes and through which the flue gases pass are arranged in six groups. The electrodes are suspended at the top from a rack which provides the required insulation and are connected with the high tension direct-current line at the bottom. The gases from the furnaces pass through pipes 13 ft. in diameter, a Y with valves being provided to divert the gases through the treater or send them directly to the stack as may be desired. Any group of electrodes can be cut out of the circuit to permit inspection or repairs by the opening of disconnecting switches. It is stated that over 90 per cent of the flue dust can be removed and that the value of the copper, zinc and other metals recovered will pay for the treating equipment within a short time. At full load only $\frac{1}{2}$ amp. high tension direct current is needed.



The Flue Gases in a Copper Refinery Pass through a Pipe 13 Ft. in Diameter where the Solid Metallic Particles Are Precipitated by the Use of a High Tension Electric Current or Can Be Sent Direct to the Stack

TURBINE ENGINE SUPERVISION

Distribution of Large Engines by the Government—The Policy Explained

WASHINGTON, July 30.—An important conference of representatives of the leading turbine engine manufacturers was held here July 24 with a special committee of the War Industries Board, to consider a number of problems now confronting producers. Those conferring with the board included representatives of the General Electric, Westinghouse and Allis-Chalmers companies.

In connection with this conference, officials of the War Industries Board gave out some interesting details regarding the partial taking over of this industry by the Government, concerning which a brief unofficial announcement was made nearly two months ago. The necessity of bringing the turbine engine manufacturers under Governmental supervision grew out of a situation that developed when the Navy Department, the War Department, and the Emergency Fleet Corporation were found to be competing with each other for motive-power units, each claiming priority over the others. The Navy Department, being first in the field, and having on foot a very large program of naval construction, in addition to a special project involving the building and equipment in record-breaking time of no less than 160 destroyers, had secured the attention of the engine builders before the Emergency Fleet Corporation had developed its plans and before the engineers in charge of the big ordnance manufacturing plants financed by the War Department had worked out their power problems. This situation gave the Navy a decided advantage, and promised to make it difficult for the Fleet Corporation to supply power units for the vast tonnage of merchant ships now planned. It also threatened the rapid expansion of ordnance production, which is now one of the most important features of the project for winning the war.

Mr. Schwab's Statement

Mr. Schwab has repeatedly emphasized of late the necessity for rounding out his construction program by developing the existing facilities for the manufacture of engines and all forms of auxiliaries and equipment. He recently testified before the House Committee on Appropriations that an expenditure of from \$150,000,000 to \$300,000,000 for the expansion of existing manufacturing capacity along these lines would enable the Emergency Fleet Corporation to complete from 8,000,000 to 10,000,000 dead-weight tons of cargo ships during the calendar year ending June 30 next. He intimated, however, that without this expansion it would be impossible to provide power for a considerable percentage of the hulls that could be built with the material now in sight.

To meet this situation the Government notified about a score of manufacturers of turbines that the War Industries Board would supervise the distribution of the output of such engines of 700 hp. and over, and would make all allocations thereof. It was indicated that all but a very small proportion of this output would be distributed between the Navy, Shipping Board and the War Department, and that no turbines larger than the minimum limit specified would be permitted to be delivered to private parties or to Government departments for non-war purposes, except upon permits issued by the board. The board also stated that a tentative priority arrangement would be worked out for allocations for war purposes, and the manufacturers would be relieved of any embarrassment that might arise as the result of pressure from officials responsible for the war program.

Turbine Engine Requirements

The special committee of the War Industries Board having this matter in charge has recently addressed letters to Secretary of the Navy Daniels, Secretary of War Baker, and Chairman Hurley of the Shipping Board, asking for detailed schedules of turbine engine requirements. These schedules are to be prepared with

the utmost care, and will contain all necessary specifications to enable the War Industries Board to distribute the business to the best advantage among existing plants. Work has already been begun on the schedules, and every effort will be made to complete them at the earliest practicable date. When this information is received a plan to determine priority as between the Navy, the Army, and the Emergency Fleet Corporation will be worked out.

By restricting engine deliveries to the three departments referred to, it is believed that power units can be supplied as rapidly as they are needed for several months to come, and that in the meantime increased capacity can be arranged for on a basis that will take care of the demands of the Emergency Fleet Corporation. The engine builders have long had the naval program in mind, and have set aside a certain proportion of facilities to take care of it. While a very large amount of power will be required to equip some of the new ordnance plants, it is thought this can be supplied without difficulty with the present facilities for producing stationary turbines. The strain will come, however, in turning out a sufficient number of marine engines to keep pace with Mr. Schwab's plans for building cargo vessels, which are now taking shape in a manner that promises the materialization of the most sanguine hopes of the Director-General of the Emergency Fleet corporation.

Nitrogen Fixation—Use of By-Product Coke Ovens

Electric power for nitrogen fixation is the subject of a paper presented by E. Kilburn Scott at the meeting of the American Institute of Electrical Engineers held early this year at Atlantic City. The indirect method for the production of nitric acid, employing calcium cyanamid, is compared with the direct method consisting in production of the acid by combining nitrogen and oxygen of the air in the electric arc. It is claimed that the direct method is better because of the simplicity of plant and of operation and the possibility of working with off-peak power, permitting of the utilization of existing power plants with consequent improved power factor and reduced costs.

Regenerative coke oven plants are proposed for the manufacture of ammonium nitrate, required in large quantities now for burster charges for shells, torpedoes, mines, grenades, etc., and after the war for fertilizer as well as for safety explosives and other purposes. This compound is made from nitric acid and ammonia, both of which are difficult to transport, the first because it is a corrosive acid and the second because in every ton of aqua ammonia there are about 2½ tons of water. The use of coke ovens is claimed to be ideal as half the total gas made is available for the production of electrical energy while the nitrogen contained in the coal provides about the right amount of ammonia necessary to combine with the nitric acid made from the electric energy by the arc flame process.

The scheme requires a battery of coke ovens, an ammonia recovery plant, electric power house, an electrochemical plant for the manufacture of nitric acid from air and a nitrate house for combining the ammonia from the coke ovens with the nitric acid from the electrochemical plant. The complete project requires only two raw materials, viz., coal and brine. Included in the products which can be made are coke, ammonium nitrate, toluol, benzol, naphtha, tar and sodium nitrate-nitrite. The transportation difficulties are overcome by this method as the ammonia has only to be piped a few yards to the nitrate house and there is no carriage of acid.

A battery of 100 Koppers type ovens with a total consumption of 1900 tons of coal per day is calculated to produce 7000 tons per annum of ammonium nitrate. With electrical energy at 5 mills per kilowatt-hour and ammonia at 13 cents a pound, the ammonium nitrate can be made at less than half the price the Government is now paying. It is estimated that the coke oven plants in this country could supply all the ammonium nitrate required for our needs if operated on the basis outlined.

Working on the Housing Problem

WASHINGTON, July 30.—The problem of housing the workers in munition plants and other war industries is becoming so acute because of the delays inseparable from so large a construction project as that now being worked out by the Bureau of Industrial Housing and Transportation that it has been found necessary to organize a Homes Registration Service for the purpose of utilizing all available existing housing facilities. This work is progressing rapidly, and already the service has been established, or is in process, in 23 cities, as follows: Alliance, Ohio; Asbury Park, N. J.; Bath, Me.; Butler, Pa.; Bridgeport, Conn.; Chicago, (including East Chicago, Hammond, Gary); Dayton, Ohio; Davenport, Iowa; Easton, Pa.; Elizabeth, N. J.; Erie, Pa.; Lowell, Mass.; Moline, Ill.; Newark, N. J.; New Brunswick, N. J.; New London, Conn.; Newport, R. I.; Niles, Ohio; Norfolk, Va.; Perth Amboy, N. J.; Rock Island, Ill.; Sharon, Pa.; Warren, Ohio.

The Homes Registration Service is made possible by cooperation between the Bureau of Industrial Housing, the Council of National Defense, and state and local defense bodies and the United States Employment Service. In every community, vacancy canvasses are being made by the local council. The number and kind of houses, flats, and rooms are quickly ascertained. Exact information concerning the utility of these housing resources for men and for women is obtained. Data concerning the general location of the houses with reference to nationality needs, as well as to prices, are being accumulated. In some cities the central registry kept by the Homes Registration Service records lists of rooms in suburbs a half hour or more distant from the factory. After this voluntary survey, lasting two or three days, has been made and a complete list of vacancies for the city is secured, professional representatives of the Homes Registration Service verify the reports.

The directors of the local Homes Registration Service, composed of representatives of local organizations, pass on these questions and refuse to list houses or rooms which would impair the efficiency of the war workers until quarters are made wholesome. The national government thus is enabled to communicate direct with each local group.

In every city where the Homes Registration Service has been established war workers are presented with lists of rooms, apartments, and houses which have been accurately classified in accordance with the probable needs and desires of the applicants. Every effort to protect the health and morals and to insure comfort is being made. In addition to the services already in existence, measures are being taken to build up organizations in other cities.

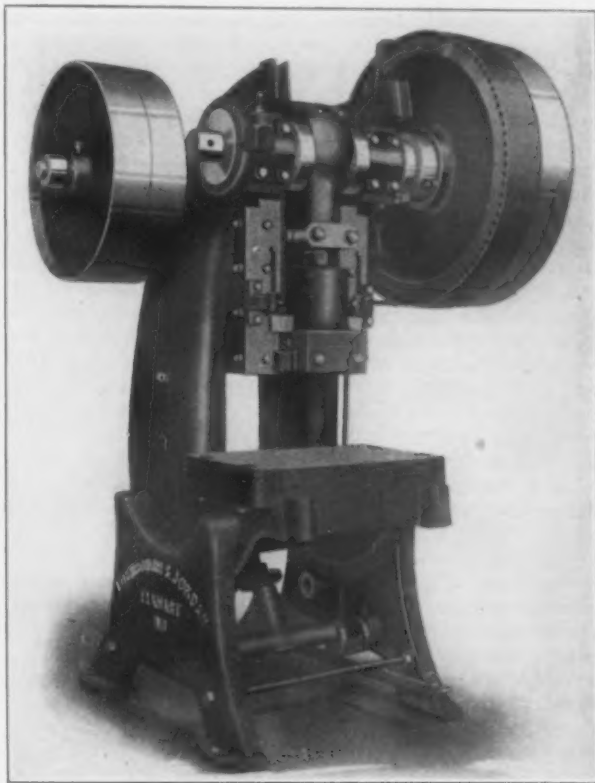
Standard Roundhouse Adopted

The Pennsylvania Lines West have adopted a standardized type of construction for engine terminals. The frame of the roundhouse will be of steel with reinforced concrete roof and 75-ft. bridge cranes. Each roundhouse will include a complete smoke exhaust and washing system, shop buildings, and other facilities. The first roundhouse of this type will be erected by The Austin Co., Cleveland, at Crestline, Ohio. This will be a 30 stall house costing approximately \$500,000 and is to be completed in 120 working days. It is expected that a similar unit will be erected at Richmond, Ind., in the near future. The Austin Co. has also been awarded a contract for a locomotive erecting and machine shop, 200 x 420 ft. at Logansport, Ind. This shop will be built according to designs and specifications prepared by the Austin Co., and will cost approximately \$600,000. Among other special features it will be equipped with a 250 ton bridge crane. The building is scheduled for completion in 120 working days.

The Austin Co., Cleveland, has opened a branch office in Chicago as a result of an increased volume of business from the Middle West. The office is located at 437 People's Gas Building.

New Open Back Inclinable Power Press

A recent addition to the line of power presses built by the Loshbough-Jordan Tool & Machine Co., Elkhart, Ind., has been placed on the market. This press, which is designated as the No. 5 size by the builder, can be supplied in the plain flywheel, geared or combination geared types. In addition to a safety stop to lock the clutch pin while dies are being set without removing



A Ball and Screw Connection with Means for Taking Up Wear Is Provided for the Adjustment of the Slide in a Recently Developed Power Press of the Open Back Inclinable Type and the Use of a Solid Web Flywheel Is Relied Upon to Prevent Accidents

the belt from the flywheel, a solid web flywheel is used, this construction being relied upon to eliminate the accident hazard that is present where a flywheel with open spokes is used. Another feature of interest about the press is the means provided for the adjustment of the slide.

The press, which can be inclined easily, is provided with a flywheel 36 in. in diameter with a 6-in. face operating at a speed of 100 r.p.m. This flywheel is equipped with a three point contact for the clutch pin with tool steel striking pins and a large cavity in the hub to receive the grease lubricant. A positive toggle control of the clutch cam, which is relied upon to eliminate likelihood of the cam kicking out due to a weak spring or slightly worn parts and thus permitting the press to repeat, is provided to give a positive lock for the clutch arm until tripped by the foot.

The slide which has a standard stroke of 3 in. and a 3-in. adjustment is provided with long guides and an upper knock out equipped with screw stops. The adjustment of the slide is regulated by a large ball and screw connection which is milled to a hexagon shape at the lower end to fit a wrench. A nut is also provided to take up wear on the ball connection. A square hole, measuring 2½ in. on a side, is provided in the slide for the clamping of punches which enables those having shanks that are not exactly the standard size to be clamped readily. Lugs for the attachment of punch holders are also provided for the slide and if desired a lower knock out can be supplied. The slide is square, measuring 9½ in. on a side.

The base can be furnished with a round opening 14 in. in diameter or an oblong one measuring 10 x 14 in. The area of the bolster plate is 17½ x 29 in. and it is 2¼ in. deep. The floor space required is 44 x 46 in. and the complete weight of the press is 4200 lb.

Women Workers Make Good Showing

Welfare Committee of Cleveland Chamber of Commerce
Makes an Interesting Report, Including Numerous
Recommendations as to Employment Conditions

THE problem of substituting woman power for man power in industry has been given much study by the industrial welfare committee of the Cleveland Chamber of Commerce, which has just prepared a long and interesting report in which are embodied the results of its investigation and also various recommendations. A number of Cleveland manufacturers are members of the committee and its chairman is Edgar E. Adams, general superintendent Cleveland Hardware Co. The committee's report has been approved by the board of directors of the chamber and will be published shortly. It is of much general interest, as most American cities that are large manufacturing centers are confronted with the same problems that result from the substitution of women for men in factories as Cleveland manufacturers are being compelled to meet.

In dealing with the problem the committee viewed the subject from the broad standpoint of the interests of both the employers and the women. In the opening paragraphs of its report, the committee calls attention to the steady increase of the number of women in Cleveland factories, in the number of plants employing women, and also the increase in the number of kinds of work women are doing, and it states that it seems advisable that the chamber should be prepared to answer questions from the two groups most directly interested, the women who are seeking to enter the industries and the employers who wish to know what alterations they must make in their shops and management before they can take on women employees with fairness to the women and without decrease of output. In gathering the information for the report, the committee states that it was assisted by the employment managers, the production managers and the wholesale merchants' board of the chamber, and much information was obtained through these sources.

Matter of Shop Management

"The whole question outside of wages is largely a matter of shop management," says the report. "For by long training and convention women make of their working environment and association a personal matter much more than do men. There must undoubtedly be many changes before women are successfully introduced in shops which have been adapted hitherto to men." The committee found that there had been little difficulty in the introduction of women workers into Cleveland shops. The attitude of organized labor was fair, the chief concern of the unions and of men in non-union shops being that women should not cut the rate of wages. Some of the industries that have introduced women successfully chose their first women employees very carefully, giving employment only to those who had relatives already employed in the plant. This gave each woman an advisor among the men and made matters much easier both for the women and for the shop management.

The report states that production and employment managers were found to be practically agreed on certain features of management that are especially helpful in respect to the employment of women. These are summarized as follows:

There should be a forewoman in departments where women are employed. There should be separate rest rooms and toilets for women. First aid provisions where there is danger of accident are essential. There should be a restaurant or at least a lunch counter with hot coffee, tea, milk, etc.

On some points the production and employment managers were not unanimous, but on the whole favorable. These points include the following:

There should be rest periods and these periods in the metal industries should be more frequent for the women than for the men. Possibly there should be a transference of workers on monotonous processes to avoid fatigue, and women more than men should be assigned to machine processes on medical certificates of fitness. In the matter of clothing, both the employers and the women agreed that a woman's hair should be bound tightly to her head by a cap or something similar to avoid danger of overhead machinery. The committee found that the subject of garments to be worn by a woman is one which Cleveland employers approach with great diffidence, and the wearing of bloomers or other garments designed along the lines of safety is still optional.

On the subject of wages, the committee found that women on piece work receive the same pay as men and on an hourly wage scale less than men and slightly more than boys. There is a difference in the rate between men and women when men are used to handle heavy material for a number of women for sharpening their tools, lifting or setting up for them. "On the whole, the theory of equal pay for equal work does not seem to be questioned when it comes to piece prices in low skilled processes," says the report. "In determining what is equal work, however, there must be some method of judging relative efficiency of men and women on the same processes."

Cleveland production and employment managers were asked to average relative efficiency between men and women as to production, attendance, tardiness, lengths of service, and ease of transference. The relative efficiency of men and women employed in the metal industries in that city as estimated by these managers is as follows:

Comparison of Men and Women

Of the reports received 64 per cent said that women are more productive than men. None said that they are less productive. Twenty-four per cent said they are equal to men and 12 per cent were in doubt.

In the matter of attendance, 28 per cent of the managers reported that women are more regular in attendance, 24 per cent found them less regular and 48 per cent said that there is no difference between men and women in this respect.

On the subject of tardiness, 43 per cent found women more prompt than men, 24 per cent less prompt and 33 per cent that women are equal to men in promptness.

Thirty-five per cent of the managers reported that women are more easily transferred than men, 20 per cent that they are less easily transferred, 15 per cent that they are equal to men in this respect and 30 per cent were in doubt.

In connection with the better production showing made by women than men for the same class of work, it was suggested that women have been used only on processes that require little training and on which men with their larger hands and slower movements are obviously not adapted, and that some of this work might well be called women's work on which men have been used, instead of men's work for which women are being substituted. The committee found in investigating the methods of industrial training for women that shop training is emphatically preferred by most of the plant managers to any industrial training in the schools. Some of the plant managers reported that shop instruction was given by a foreman or forelady or by skilled operators.

Taking up the subject of the sources of supply of women labor, the committee found that women came to industrial plants in three ways. One way on which

employment managers most largely depend is through friends already employed in the plant. The second way is through advertising and the third way is through employment agencies or exchanges. The report states that in the introduction of women to a new industry the first method of securing workers is by far the most effective way from the point of view of the shop management, as it overcomes many of the shop prejudices and obviates many of the shop difficulties. However, the committee felt that some central agency for the distribution of women labor as well as for information as to employment needs and individual opportunities open to women would be of immediate and practical value both to the women and employers. In this connection it is stated that the State-City Free Employment Bureau in Cleveland should be the dominating employing agency, but reports indicate that it is being used but little. In reply to a question as to whether manufacturers were assigning women to machines because of any physical or mental fitness, manufacturers indicated that they were giving this phase of the subject little attention, as they were following the policy of assigning light women to light work and heavy women to heavy work.

Recommendations

At the conclusion of its report, the committee makes a number of recommendations. That on wages is as follows:

"As a generalization equal pay for equal work can be accepted. In actual practice the committee finds that women are seldom employed on exactly the same work as men, and that women are handicapped by the limitations of law and even more of custom. The overhead charges of plant and maintenance of plant and of supervision are greater in the case of the employment of women than they are for men. Money and time spent on the training of women bring less return to the industry than that spent on men, because marriage ends, for a time, women's productiveness, and also because promotions which would be routine and acceptable in the case of men are not possible in the case of women when the promotion involves supervision over men. The committee is of the opinion that each case should receive careful consideration not only in justice to the women but for the promotion of the output of the industry. Equal pay for equal work should be given wherever possible."

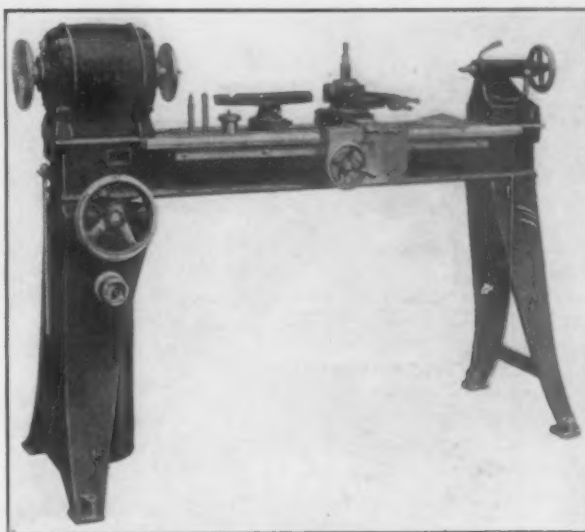
On the subject of training, the committee recommends that the industrial training of women should be partly inside and partly outside the shop. In this connection it recommends co-operation with the vocational training department of the Ohio State Board of Education and with the United States Shipping Board in establishing out of shop and in shop training.

On the subject of physical fitness as the basis of assignment to processes, the committee recommends that women as well as men should be assigned to machine operations after examination and determining of their physical fitness for the particular work. In this connection it also recommends the organization of the medical industrial officers of Cleveland in connection with the industrial department of the chamber. The adoption of the United States Department of Labor standard for computing labor turnover is also recommended. After this report was signed, the Cleveland employment managers agreed to adopt this standard. A recommendation is also included for a centralized employment agency. Either the women's division of the City-State Free Labor Exchange should be strengthened or some co-operative agreement should be made by the industries themselves to centralize employment information and the distribution of skilled and unskilled women. This, the report says, is an immediate essential in the present industrial situation for employment managers in competing with each other for labor merely augment each other's labor turnover.

The Atlantic Mfg. Co., maker of screw machine products, formerly located at Bridgeport, Conn., is now occupying its new plant on New Haven Avenue, Milford, Conn.

An Alternating-Current Speed Lathe

The Oliver Machinery Co., Grand Rapids, Mich., has recently brought out a speed lathe equipped with a three-phase alternating-current motor. Like the direct-current and single-phase lathes of this type which have been on the market for some time, the motor is built into the headstock and is totally inclosed. The machine illustrated is equipped with a hand feeding carriage



A Three-Phase Alternating-Current Motor Built into the Headstock Is One of the Distinguishing Features of a Recent 12-In. Speed Lathe, the Four Rates from 570 to 3450 R.P.M. being Secured by a Handwheel Operated Controller Mounted Inside the Leg

and a compound swivel rest, but it can also be furnished with a plain bed for turning work measuring not more than 24 or 36 in. between centers and not exceeding a swing of 12 in.

Another feature of the motor headstock is the use of a combined handwheel and faceplate for the rear end of the motor, and an application has been made for a patent covering this construction. The outer edge is rounded off the same as a handwheel, while the inside face is curved in to give the advantage of the handwheel shape, although the outer surface is perfectly straight and flat, thus forming a faceplate for rear end turning.

The controller employed to give the four variations in speed available is mounted on the inside of the left leg. It is operated by a handwheel which is marked for the off position, as well as the four rates of 570, 1140, 1725 and 3450 r.p.m. respectively. Turning one of these marks to the top causes the motor to operate at the indicated speed or to stop if the off indication is uppermost. It is emphasized that the mechanism is such that the handwheel cannot be turned in the wrong direction, and when it is turned to any one of the four positions, the motor will operate exactly as it did when the handwheel was previously in that position.

California Manufacturers Organize

Following a meeting at Oakland, Cal., of representatives from 39 trade and business organizations in the State a new association has been organized, to be known as the California Manufacturers' Association. The officers elected for the ensuing year are John R. Miller, president, Oakland; W. L. Moreland, Moreland Motor Truck Co., Los Angeles, first vice-president; C. C. Newkirk, Berkeley, second vice-president; George D. Clark, San Francisco, third vice-president; and Fred Boegel, Jr., Oakland, secretary-treasurer. Executive offices will be established temporarily at Oakland.

The Phillips Sheet & Tin Plate Co. announces a change of corporate name to Weirton Steel Co. There is no change in ownership or personnel of the officials or directors. The principal offices will be located as heretofore, at Weirton, W. Va.

The Cripple's Ability as a Metal Worker

Recent Survey of His Possibilities and Limitations—An Analysis of Operations Feasible for One - Armed or One - Legged Workers

BY DOUGLAS C. MCMURTRIE*

AS a whole the metal industry is stable, and at present seems to be in a flourishing condition, due to the fact that the Government requires a great quantity of metal goods. The only branch of the trade that is not doing well is the light fixture trade.

Advantages for the Crippled

1. A good deal of the work is bench work and is done seated.
2. It is practically non-seasonal, except in the lighting fixture trade.



The Reproduction of Muscular Movements by Prostheses, or Artificial Aids, Are Rather Startling to the Uninitiated, But Prove Practicable as a Means to Restore the Maimed to Useful Occupations. Crippled soldiers are here shown operating drilling machines of both the vertical and horizontal types

3. The wages are high.
4. Although some of the work is very skilled, the majority of employers interviewed agreed that a man could learn most of the processes in five or six months.
5. Most of the employers are willing to take learners.

Disadvantages for the Crippled

1. There is a great deal of heavy machinery such as power presses which are rather dangerous; and the spinning machine, which is extremely heavy and tiring to work at.
2. While the conditions in the new factories are excellent, there are a great many smaller factories in old buildings where there are no elevators and where conditions in general are very poor.

Wages: Generally speaking the wages are high, ranging from \$10 to \$15 a week for unskilled workers and from \$20 to \$45 for skilled work.

Nationalities: Almost all nationalities are taken, but few negroes are employed. The employers seem to feel that the white men do not like to have negroes working with them.

Unions: There are several large unions in the sheet

metal industry, but a great many of the factories visited had open shops.

Disabilities

Work in the metal trade would not be good for anyone suffering from nervous strain as there is a great deal of noise and even the bench work is not quiet, as there is usually heavy machinery nearby. This trade would also be bad for anyone suffering from lung diseases or lung wounds as in the buffing, polishing and filing, etc., there is a great deal of powdered metal in the air.

Processes Adaptable to One-Armed or to One-Legged Worker

Following are processes which are considered possible for one-armed men:

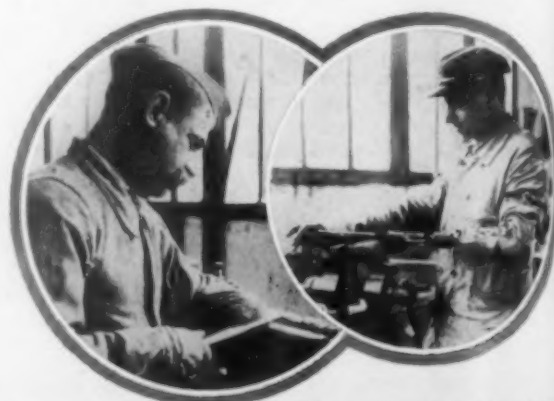
Soldering	Eyeletting
Wiping out cans	Punching holes
Testing cans	Straightening molds
Touching up cans	Grinding machine (work arm necessary)
Trimming	Forming tools (work arm necessary)
Air brushing	Jig sawing
Riveting covers	Sand papering
Forming tools	Foot press stamping
Shearing (power press)	
Flattening	
Feeding automatic machine	

Following is work which the investigator considered could be done by one-legged men:

Machine press hemming	Grinding machine
Cutting tin (foot power press)	Assembling
Buffing	Stamping
Polishing	Screw machine
Silver plating	Power press
Die making	Jig sawing
Threading (beveling edge)	Pattern making
Welding machine	Metal spinning
Press work	Metal cutting
Wiring (bench work)	Engine lathe
Repairing molds	Engine milling
Casting molds	Drop press
Casting hinges	Riveting frames
Planer	Sorting tin
Lathe machine	Rolling tin (power press)
Milling machine	Foot press stamping
Forming tools	Power press stamping

Attitude of the Employer

All the employers seem to be willing to take crippled soldiers. Most of the employers seem to think that there are a few processes at which one-armed men can work, but that a one-legged man could work at almost



One of the French Soldiers Doing Filing Is Unable to Overcome a Dislike for Artificial Aids, Preferring to Use the Stump

*Director Red Cross Institute for Crippled and Disabled Men, 311 Fourth Avenue, New York.

all processes. The employers also seem to feel that most of the processes could be learned inside of six months.

Analysis of Work Feasible for Cripples

Buffing: Standing work for one-legged man; wages \$12 minimum, \$18-\$25 maximum. Man is obliged to stand and hold metal piece against large automatic wheel.

Polishing: Standing work for one-legged man similar to buffing.

Nickel Plating: Standing work for one-legged man; metal articles are strung on wires and hung on metal bar in large vats of acid, an electric current being run through the metal bar.

Making Wire Link Bedsprings: The wire, coiled on a spindle, passes through a machine which cuts it into short lengths, making a hook at each end, and fastening the lengths together to form a long chain. These machines are automatic. One man takes care of all the machines on the floor and keeps them in repair. A man who had lost a foot could do the work if he could stand all day. These links are fastened into the riveting frame by hand. A one-legged man could do this work as it requires no lifting and little walking. It could not be done by one-armed men, as it necessitates the using of the fingers of both hands.

Woven Wire Springs: The long spirals of thin wire are woven together by a simple machine operated by one foot. For sanitary reasons these springs have fallen into disfavor, and fewer of them are made each month. At present at one plant only two men are employed on these machines for part of each day. The manager predicts that they will soon be unknown.

Power Machine Operating: The covers are sewed on power machines, furnishing work to all the workers possible to obtain during the busy season. The machines can be run by one-legged men. Speed is necessary as the work is piece work. About two months are required to learn.

Fastening Eyelets in Hammocks: Brass eyelets are inserted in the sides of hammocks, through which the cords are strung. This is done by a simple machine operated by one foot. It could therefore be done by one-legged men, and possibly by one-armed men. However, two men working at this work, two hours each day, can handle the output of the factory. The work is seasonal.

Riveting: Standing work for one-legged men. Pieces are riveted together by hand with riveting hammer. Holes are punched in with riveting stake.

Pattern Making: Standing work for one-legged men. Consists of building patterns for metal castings. Each pattern is a full-size model of the piece to be cast and is usually made of wood. The tools used are the same as those of wood-workers and work similar to cabinet making. Ability to read blueprints is an essential requirement.

Metal Spinning: Standing work for one-legged men. This is very heavy work and should not be attempted by a man who is not fairly strong. Consists of putting flat metal sheet on an automatic revolving disk and holding a long iron bevel against the edge so that the metal sheet is gradually spun into a concave piece.

Metal Cutting: Standing work for one-legged men. This is done by automatic machine with large shears somewhat similar to power press.

Automatic Power Press: Cutting designs: Seated work for one-legged men. Right foot pedal brings down press. Must be fed with both hands.

Automatic Power Press Wiring: Seated work for one-legged men. Similar to above except that wires are put into curled edge.



Not All Disabled Men Are Cripples, Although the Man in the View to the Left Doing Light Turning Work Was Disabled in a Munitions Plant. The one-armed worker is operating a sheet metal press with only half a foot (not apparent). Paralysis of the legs does not prevent man shown in lower view from doing light grinding work

Japan Varnishing: Seated work for one-armed man. Consists of varnishing cans, boxes, etc.

Torch Soldering: Seated work for one-armed man. Same as ordinary soldering except that torch is used.

Cutting Machine Press: Standing work for one-legged man. This is a foot-power press which shears the tin.

Wiping Out Cans: Standing work for one-armed man. Consists of drying cans after they have been washed out.

Eyeletting: Seated work for one-armed men. Automatic machine which perforates holes in metal.

Punching: Seated work for one-armed man, similar to eyeletting.

Threading: Seated work for one-legged men. Consists of a revolving disk upon which piece of metal is placed. Cutting tool is held against the edge and bevels it.

Auto Machine Press Cutting: Seated work for one-legged men. Tin sheeting is shoved into cutter. Right foot is used to bring down press which chops metal into pieces.

Wiring: Seated work for one-legged men (bench work). Wire is put through rolled edge of molds to reinforce them.

Repairing Molds: Bench work for one-legged men. Seated.

Casting Molds: Seated work for one-legged men. Consists of packing damp sand about a pattern in such manner that when pattern is withdrawn a cavity called "the mold" is left in the sand. This mold is then poured full of molten metal which forms the piece to be cast. This work is sometimes done by machines.

Casting Hinges: Similar to above process. Work for one-legged men.

Filing: Seated bench work for one-armed men with work arm. Piece is held in one hand and rough edges filed off with hand file.

Soldering: Seated bench work for one-armed man with work arm. Piece is held with one hand and solder applied with a long bar.

Die Making: Standing work for one-legged man. This work calls for high degree of skill. Machinist

must have special knowledge and skill in designing, shaping and sharpening tools. It is very exact work and has to be measured up to the pattern. It consists of taking a piece of metal, cutting it down by means of various machines into a given shape.

Screw Machines: Standing work for one-legged men. In some types the faces of the revolving tool-holding device, called a turret, holds tools of different kinds. In some types the turret instead of being square or hexagonal is shaped like a drum. As each operation is completed the drum, with the tools it carries, backs away from the piece, and with a slight turn brings the next tool into position. Usually the stock is fed to the machine in long bars or rods.

Power Press: Standing work for one-legged men. It is a large press which works with foot pedal, sometimes automatic, and cuts the metal with a blade.

Jig Sawing: Seated work for one-legged men. Consists of metal saw like hand tool which saws metal into small pieces.

Assembling Parts: Seated work for one-armed man.

Planer: Standing work for one-legged men. As its name indicates, machining plane or flat surfaces. The piece is firmly set on a flat bed or table which moves backward or forward under a stationary tool. For light work on plane surfaces a shaper is used. The principle is the same except that the tool moves while the piece is stationary.

Lathe: Standing work for one-legged men. The lathe was developed from the potter's wheel. The piece to be turned is mounted on a revolving spindle and the cutting tool automatically moves along the surface of the revolving piece. In a hand lathe the cutting tool is held against the piece by hand.

Milling Machine: Standing work for one-legged man. The operating principle is the same as that of a circular saw. The machine is provided with one or more circular cutters having a number of teeth or cutting edges, each of which removes a chip of metal from the piece as the cutter revolves. It is provided with graduated dials which permit of accurate adjustment to less than 0.001 in.

Forming Tools: This is seated bench work for one-legged men. Calls for high degree of skill and practical knowledge of designing, shaping and sharpening of tools.

Grinding Machine: Seated work for one-armed men. Work is performed by a grinding wheel of emery or corundum. Only a slight thickness of metal is removed, the piece being first reduced to the desired size on a lathe or milling machine and then finished by grinding. A shaft for example is turned in the lathe to within 1/32 in. of its proper diameter, and then transferred to grinder which brings it down to exact size, leaving a perfectly smooth surface.

Assembling: Seated bench work for one-armed men. As its name implies it consists of assembling various parts.

An electrolytic method by which a metal may be recovered in a state of substantial or commercial purity from its alloys is announced in a patent (U. S. 1,260,661, March 26, 1918), granted to Julius H. Gillis, of Toronto, Canada. The invention is described by a specific illustrative example whereby nickel is deposited at the cathode, a nickel-copper anode being employed. The inventor claims that the principle is applicable to the electrolytic recovery of other metals from their alloys. The method consists in passing an electric current from an alloy electrode to a suitable cathode through an electrolyte containing a salt of a metal to be deposited and reversing the polarity of the electrodes at such intervals and for such periods as to avoid substantial deposition upon the cathode of any undesired components of the alloy anode.

The Aspromet Co., Pittsburgh, maker of asbestos-protected metal sheets and skylights and monitor sash, has opened an office in the Munsey Building, Washington. O. O. Robinson, district manager, will be in charge.

SHIP STEEL BY EXPRESS

Director-General Schwab Takes Steps to Assist Shipbuilding on Pacific Coast

SEATTLE, July 29.—The visit of Director-General Charles M. Schwab to Seattle recently resulted in the establishment of the steel shipbuilding industry on a firmer foundation than ever before, as the result of his action in arranging for uninterrupted shipments of steel. One large plant in the city has recently laid off more than 1000 men because of non-arrival of steel materials. Orders have been placed by Mr. Schwab for shipments by express of several thousand tons of steel, and it is expected construction will go ahead at a new pace. The steel shipbuilding plants in Seattle employ about 25,000 men, besides 3000 men employed in sub-contract shops.

According to recent statistics prepared by the Chamber of Commerce of Portland there are now more than \$200,000,000 in unfilled contracts being handled by Portland and Columbia River shipbuilders, as compared with a total of \$22,250,000 in contracts in December, 1916. There are four large steel shipbuilding plants and 17 wooden ship plants.

Recommendations, amounting in effect to contracts, have been made in Portland as a result of the visit of Director General Schwab, for awarding addition orders to seven plants in the Portland territory, the total number definitely promised being 14 steel steamers and 16 wooden vessels. The Northwest Steel Co. will build 10 additional vessels of 8800-ton design, and the Albina Engine & Marine Works will build four 3800-ton ships. The G. M. Standifer Construction Corporation has contracts for 10 9500-ton ships.

Conversion of Plants for War Work

The survey and conversion section of the War Industries Board at Washington has announced some of the conversions of factories in war work already accomplished.

"The extent to which the conversion to war work can go is not known by the ordinary manufacturer," says A. A. Templeton, advisor of the Michigan division of the War Industries Board, and president of the Detroit Seamless Steel Tubes Co. "While in Washington last week we learned, for example, of the following changes of manufacturing concerns: from auto tires to parts of shells and army cots; from linoleum to machining 4.7-in. shells; from terra cotta tile to dummy drop bombs; from kettles to buoys and floats; from agricultural implements to marine engines; from dump cars to ambulance bodies; from horseshoes to trench picks; from rowboat motors to grenades; from ladies' waists to signal flags; from men's shirts to mosquito net; from vacuum cleaners to Liberty motors; from gas heaters to carburetors; from automobiles to wheel hubs; from building materials to pontoon cars. Two Detroit concerns were mentioned. One of them, formerly making limousine tops, is now making metal stampings for airplane motors, and another, formerly making automobile bodies, is now making bombs.

"These examples tend to show what plants can do in converting their facilities to war work, and it will be one of our duties to see that concerns in our district realize what can be done with their facilities and to assist them in securing orders from the Government."

Steel ingot production in June should have been reported at 3,083,446 gross tons, or 46,516 tons more than the returns originally received from producers by the American Iron and Steel Institute. A revision of figures by one of the leading makers adds this amount to the open-hearth output, which should have been reported at 2,281,781 tons instead of 2,235,202 tons. The amended figures indicate that the June production was on the basis of an annual output of 43,240,000 tons, calculated for 309 working days for the year, instead of 42,588,500 tons estimated from the first reports.

Non-Calipering Drill Grinding Machine

A line of twist drill grinding machines operating on a new principle has been brought out by the Grand Rapids Grinding Machine Co., Grand Rapids, Mich. No adjustment is made to take care of different sizes of drills other than setting the tailstock for the desired length. The machine has a provision for taking care of drills with an enlarged shank, as well as the standard straight and taper shank types, and uses a diamond truing device with a safety stop, a new type of lip rest and a special adjustment for clearance.

Two sizes of machine are built, one for handling drills ranging from $\frac{1}{8}$ to $1\frac{1}{2}$ in. in diameter, and the other for a range of $\frac{1}{4}$ to $2\frac{1}{2}$ in., and machines of both sizes can be furnished either with the table as shown for wet grinding or arranged for dry grinding without the table.

The lip rest on the machine, it is explained, is really four in one, as it can be attached so as to use either edge for the drill supporting edge and can then be reversed top for bottom, and again reversed in that position, thus giving four distinct settings, and at the same time having an adjustment up and down to provide for wear. The swivel stud is $2\frac{1}{4}$ in. in diameter with a bearing the full width of the column, which is relied upon to give a rigid support for the drill holder. The holder swivel bearing is $1\frac{1}{2}$ in. in diameter and $4\frac{1}{4}$ in. long, and is a stiff cored-out section casting with a bronze bushing forced in, swiveling over a ground steel stud.

As drills working on tool steel require a relatively small clearance and a strong cutting edge, while those on the soft gray iron need a greater clearance and not as strong a cutting lip, an arrangement has been provided to adjust the clearance to enable the best results to be secured. In changing from one class of drill to the other, all that is necessary is to turn a small hand-wheel which rocks the holder proper in the swivel bearing. This arrangement, it is pointed out, prevents the holder from getting loose or sliding up and down in the bearing during the adjusting operation.

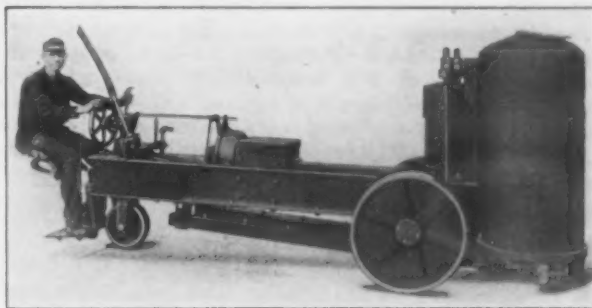
For truing the wheel, a swinging arm with a diamond is provided. This is equipped with convenient means for adjusting the diamond as the wheel is being trued, and a safety stop in the form of a track on a movable section of the wheel hood is furnished. As the truing operation progresses, this movable section of the wheel hood with its track is advanced an equal amount, thus remaining at a fixed distance from the face of the wheel. A circular stop on the front of the drill holder abuts against the track and rocks thereon

as the holder is swiveled. This stop is adjusted to bring the lip rest into the close proximity which it is pointed out is required for a perfect grinding operation, while at the same time, it is emphasized, it is impossible to get the front of the holder or the lip rest into a position relative to the grinding wheel where it would be ground off.

New Malleable Foundry Charging Truck

The Brown Specialty Machinery Co., Chicago, has developed a new charging truck designed for use in malleable iron foundries. Compressed air is employed for the operation of the truck which is of simple yet substantial construction.

The main frame of the truck is composed of two channels from which the forged steel raising and lowering arms are suspended. An air cylinder receiving its



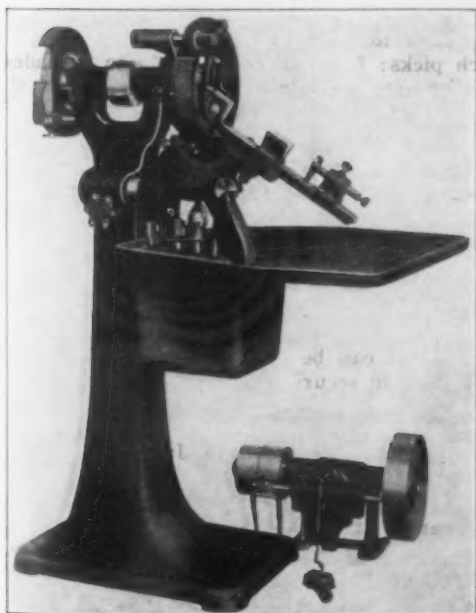
Compressed Air Supplied through a Suspended Hose Provides for the Operation of a New Charging Truck for Malleable Iron Foundries

supply of compressed air from a hose suspended from above provides means for the raising and lowering of the arms. The operation of these arms is controlled from the operator's seat and removable cast steel tangs which can be readily replaced when worn are provided for the arms.

The truck is driven by a reversible air motor through a set of reduction gears and a standard motor truck differential, the power being transmitted to pinions meshing with internal gears on the driving wheels. Operating speeds of from 90 to 120 ft. per min. can be secured and the air consumption is approximately 80 cu. ft. per min. A standard motor truck steering worm arranged so that the truck can turn in its own length provides for the steering of the truck.

Opens Machinery Display Room in Milwaukee

The Federal Machinery Sales Co., 10 North Jefferson Street, Chicago, dealer in new and second-hand machine tools, has opened a display room at 212 Sycamore Street, Milwaukee, where, so far as circumstances will permit, it will maintain a stock of the machines for which it is sales representative. The new display room, which contains 3000 sq. ft., will be in charge of H. L. Cole, recently appointed Milwaukee manager. The company has been appointed agent in the Chicago and Milwaukee territory for Henry & Wright, Hartford, Conn., makers of high-speed, ball-bearing drilling machines. These machines have from one to eight spindles, and range in capacity from $\frac{1}{2}$ in. to $1\frac{1}{4}$ in. The Federal company recently acquired the line of turret lathes and screw machines made by the Southworth Machine Co., Portland, Me.



A Recently Developed Drill Grinding Machine in Which the Only Adjustment Necessary for Different Sizes of Drills Is the Setting of the Tailstock to Take Care of Variations in Length

The Chamber of Commerce of St. Louis has opened Washington offices at 703 Fifteenth Street, N. W., in charge of a direct representative of the chamber for the representation of the industrial activities of St. Louis and the St. Louis industrial region of which President Jackson Johnson of the chamber has recently been appointed director. The purpose is to keep St. Louis district industries advised of war work which may be handled by plants in the St. Louis region, which includes all of Missouri except Kansas City, Arkansas, Southern Illinois and some other nearby territory.

WOMEN IN METAL TRADES

Satisfactory Results in Work Requiring Rapidity and Dexterity

Distinctly favorable results from the wartime employment of women in the metal trades are shown in a report issued by the National Industrial Conference Board. The report summarizes information obtained from 131 establishments employing 335,015 men and 49,823 women, and treats of the comparative wages and output of men and women, the hours of work and numerous other matters of general interest and of practical value to employers contemplating the introduction of female labor.

The work done by women in the metal trades embraces a great variety of processes from the operation of ordinary drill presses and lathes to coremaking, inspecting and assembling mechanical parts, and many precise machine operations. In the main, however, their work has been confined to the lighter processes in which rapidity and dexterity are more important than technical skill acquired by long training. The report emphasizes that work of a "repetitive" character is exceptionally well adapted to the utilization of female labor.

Comparative Output

Comparing the output of men and women, the report shows that in 64 establishments of the 97 furnishing specific information on this point and where men and women were employed on the same processes, the output of women was equal to, and frequently greater than, that of men. In only 15 establishments was the output of women less than that of men on all operations on which both were employed. In the remaining 18 their production, although less in some operations, equaled or exceeded that of men in others.

A highly favorable account of the efficiency of women comes from an automobile plant where they are employed in 23 departments on assembling and inspecting materials and on many types of machine work. In this case the comparative output of women on identical processes was almost invariably greater than that of men and in some cases quite disproportionately so. This establishment reported an instance where a woman employed on a nut tapping machine turned out at the end of her first week about double the output of the man working next to her. "After endeavoring to equal her speed for a few days," the report continued, "the man quit and was replaced by a woman who is now very nearly the equal of the first."

A gear manufacturing establishment where women do sandblasting, grinding, drilling, and broaching gives their output as from 15 to 25 per cent higher than that of the men.

In a munition plant manufacturing fuses, women operatives on drill presses and milling machines were found to be from 25 to 50 per cent more rapid than men. A manufacturer of small metal parts for munitions states that women drill press operators finish 196 parts an hour on day work, while men on the night shift finish only 146 an hour. Although day and night work are not exactly comparable, the output difference is enough to indicate the superiority of the women in this case.

Employers generally commended women as being more thorough and conscientious, as producing less spoiled work, and as being more careful with tools. Even where the quantity of work produced is less than that of men, the quality is frequently better. Women were also reported as more regular in production, and did not show the tendency to restrict output which is sometimes characteristic of men.

Occupations Unsuitable to Women

Whether technical training would make women the equal of men in work of higher character cannot be determined from available experience. At present their lack of training automatically excludes them from highly skilled work.

It is noted, however, that there are certain operations which no employer reports as being performed as well by women as by men, for instance, lapping and brazing both of which require considerable skill. Again, women have not proved themselves the equal of men in such comparatively heavy work as chipping castings and machine filing. Most manufacturers agree that women should not be employed on heavy work or in processes exposing them to gases, fumes, or unusually high temperatures.

General acceptance by employers of the principle of equal pay for equal work is indicated by the report. A comparison of women's wages with those of men engaged on the same processes in the 112 establishments making complete statements on output and wages shows that in 56, women receive equal pay, and in 28 equal piece rates but lower time rates. In only 28 establishments, or 22 per cent of the total, are women paid a lower scale than men for both piecework and timework. In these cases the difference ranges from 10 to 20 per cent, although in isolated instances it was 30 per cent or even more.

Among reasons assigned for a lower wage scale for women were their lower efficiency while learning and the additional expense required for special equipment and more supervision, or their need for skilled assistance, such as in setting up machines, or for help in heavy lifting. At times, however, it appeared that lower wage rates had been based on only slight differences in the character of the work.

Jobbers and Sheet Metal Work

At the fourth annual convention of the Ohio Master Sheet Metal Contractors' Association at Columbus July 23, 24 and 25, F. J. Hoersting, Dayton, presiding, the first day's session was devoted principally to a discussion on the ability of the mills to supply the contractors with black and galvanized sheets. It was the general opinion that only contractors engaged in strictly Government work would be able to secure any sheets. Reports from all sources indicated that the jobbers are running very close to shore, and in some centers they are unable to take care of any new orders.

Wednesday's session was mainly given over to a discussion of the labor problem, led by George W. Mooney of the Columbus Building Trades Association. Mr. Mooney made an attack on the closed shop policy as advocated by union labor and cited numerous court decisions as to the illegality of certain outgrowths of this policy. He was emphatic in stating that the present stand of organized labor in some parts of the country was close to the border of treason during the world's present struggle.

J. W. Lucas, J. M. & L. A. Osborne Co., Cleveland, pointed out in an address that the jobber had been able to keep a number of contractors supplied when shipments were not obtainable from the mills. A number of these contractors had urgent Government work and had it not been for the support of the jobbers, who had some stocks on hand, much important war work might have been held up. George Harms, Peoria, Ill., president National Association of Sheet Metal Contractors, called particular attention to the necessity of co-operation with the Government during the present crisis.

The following were elected officers: President, John Weigel, Cincinnati; vice-president, A. E. Munkel; secretary, W. J. Kaiser, and treasurer, W. J. Birmingham. George F. Thesmacher, William Miller and John D. Gerken were elected directors. The next annual meeting will be held in Columbus in conjunction with the national association at a date to be selected.

The plant, raw materials and finished products of the Cayuga Tool Steel Co., Auburn, N. Y., will be offered for sale Sept. 5 by George C. Pearson and George Timmins, receivers, pursuant to the judgment of the United States District Court for northern New York, on July 15, in an action in equity brought by the Lewis Foundry & Machine Co.

GUN FORGING AND MACHINING

Remarkable Progress on Sixteen Plants with Government Help

WASHINGTON, July 30.—Of 17 gun plants designed for the forging and machining of cannon, and estimated to cost \$64,768,297, 15 plants have been completed, according to an official announcement of the Ordnance Bureau of the War Department. The sixteenth plant is 85 per cent complete, and will soon be finished. Up to the present time the Government has expended in the erection of these plants \$34,768,297. The seventeenth plant, which is to be built on Neville Island in the Pittsburgh district by the United States Steel Corporation, at an estimated cost of \$30,000,000, has not yet called for disbursements by the Ordnance Bureau.

The comprehensive program involving the construction of these plants was framed just a year ago, and so rapidly has the work progressed that all 16 establishments are now producing cannon or cannon forgings for mobile artillery ranging in caliber from 1½ to 10 in. The smallest weapons are the 37 mm. rifles known as anti-tank guns, while the larger ones are the field howitzers which have proven so effective on the battlefields of France. The product of the Neville Island plant will be largely siege guns of the heaviest calibers, and no output is expected from this establishment until late 1919 or early 1920.

The Ordnance Department announced that five of the sixteen plants have their machinery 100 per cent installed and 100 per cent in operation. Five others are 90 per cent or more complete as to installation of machinery. Only two are as low as 65 per cent, and one of these is the \$9,180,207 project at the Watervliet Government Arsenal. A table showing the Government expenditures for the building and equipment of the cannon plants, together with the percentage of complete construction, installation of machinery and machinery in operation, follows:

Résumé of Cost and Work Done on New Gun Plants.

	Government expenditures for plant facilities	Per cent complete construction	Per cent complete machinery installation	Per cent machinery in operation
American Bridge Co. (U. S. Steel), Gary, Ind.....	\$2,000,000	85	65	31
American Brake Shoe & Foundry Co., Erie, Pa.....	3,150,000	100	95	95
Bullard Engineering Works, Bridgeport, Conn.....	3,062,000	100	90	80
Bethlehem Steel Co., Bethlehem, Pa.....	858,000	100	85	75
Buckeye Steel Casting Co., Columbus, Ohio.....	215,000	100	100	100
Chalkis Mfg. Co., Detroit.....	607,993	100	100	100
Edgewater Steel Co., Oakmont, Pa.....	2,162,000	100	75	65
Hoppenstall Forge & Knife Co., Pittsburgh.....	1,105,163	100	95	95
Hess Steel Corporation, Baltimore.....	451,538	100	98	65
Northwestern Ordnance Co., Madison, Wis.....	1,600,000	100	100	100
Standard Forgings Co., Chicago.....	1,627,000	100	100	100
Standard Steel Works, Burnham, Pa.....	1,392,830	100	95	95
Symington-Anderson Co., Rochester, N. Y.....	3,723,000	100	75	75
Watervliet Arsenal, Watervliet, N. Y.....	9,180,207	100	65	42
Wisconsin Gun Co., Milwaukee.....	1,003,240	100	100	100
Tacony Ordnance Corporation, Philadelphia.....	2,630,326	100	88	75
United States Steel Corporation, Neville Island, Pa.....	30,000,000	...	...	...
Total.....	\$64,768,297			

Processes in the forging and machining of cannon so differ from the ordinary commercial practices of peace times in this country that the Government was obliged to build the 16 plants from the ground up and to equip them with machinery, much of which had to be designed especially for this work. The production of cannon involved the creation of a new industry. The Midvale and Bethlehem companies were the only plants of any size outside of Government arsenals available for the manufacture of Army guns in quantities, and Midvale was largely utilized for Navy work.

The requirements for ordnance were so great that Midvale and Bethlehem could not take care of the production needed. It was necessary for the Army Ordnance Department immediately to erect and equip a large number of new plants for cannon. The organization and facilities for these were taken from factories that had been successfully engaged in the production of various types of equipment ranging from railroad appliances to high grade machine tools. While none of these companies had ever been engaged in

ordnance manufacture, all have successfully met the rigid requirements and are today turning out a product which is the equivalent of the best of the ordnance companies of Great Britain and France.

The building of the 16 plants started as soon as funds became available—in July, 1917—and progressed so rapidly that machinery was in operation and actual operations on cannon in progress in January, 1918. One plant, the site of which was a ravine in August, 1917, had completed its first 6-in. howitzer in February, 1918—seven months later.

Construction of almost all of the plants was delayed by weather conditions, traffic delays, and the pressure on the machine tool industry, upon which heavy demands were being made by many departments of the Government, including the Navy and the Emergency Fleet Corporation. The Ordnance Department was forced to wait its turn.

Typical of the weather conditions that delayed construction was the forming of two feet of ice in the wooden forms into which cement was being poured for the foundation of a large press at one of the plants. A circus tent was pitched over the operation and stoves were installed to permit the work to proceed. A storm at night lifted the tent into the Delaware River. Typical of traffic delay was the holding of five carloads of steel for three weeks within 15 miles of the site of the plant building.

Speeding Up Work in a British Foundry

How a standardization of work and the encouragement of employees to take an interest in it has trebled the output of a British iron foundry is recounted by the *London Iron and Coal Trades Review*. The foundry is an old one and by no means convenient. But every 1000 ft. of floor space in the foundry now produces 6.5 tons of light castings per week, working day shift only. This is the only foundry in Derby working a 48-hr. week. The girls and women, who throughout the works form 60 per cent of the employees, are allowed 10 min. for lunch and 10-min. interval in

the afternoon. Practically every employee has been taught in the plant. The core department is a revelation, young girls producing cores for hand grenades at the rate of 180 per hr., the cores, which take 31 movements of the hand in the making, being turned out in 16 sec. In the foundry, each molder does his own casting. However, the molds are stripped and the castings cleaned by laborers.

The total value of the foreign trade of the United States for June, 1918, amounted to \$744,816,950. Exports were valued at \$481,503,919, exceeding exports by \$244,190,888. These exports, however, are the smallest in value for any month this year except February, which they exceed by only \$73,000,000. Merchandise exported in the past twelvemonth amounts to \$5,928,337,953, or \$361,710,441 less than in the preceding twelvemonth. On the other hand, the value of merchandise imported in the year ended June 30, 1918, amounted to \$2,946,022,363, an increase of \$286,667,178 over the foregoing twelvemonth.

ELECTRIC STEEL PROTEST

War Industries Board Official Answered on Electrode Question—Steel Is Needed

The Booth-Hall Co., electric furnace builder and engineer, 565 West Washington Boulevard, Chicago, under date of July 12, received a letter from H. C. DuBois of the Chemical and Explosives Division of the War Industries Board, Washington, in which the following was stated:

"At the present time we are not encouraging, and in fact are discouraging, anyone from starting any new furnaces on electric steel. The steel division informs us that its records show at the present time electric steel production is somewhat in excess of supply, and the electrode situation being so critical, we cannot encourage any further consumption of electrodes where the product made by the use of such electrodes is not of vital importance."

Carl H. Booth, president Booth-Hall Co., as a result of the letter from Mr. DuBois, sent the following protest to the Steel Division of the War Industries Board:

We have a letter under date of July 12 from H. C. DuBois of the Chemical and Explosives Division, stating that you are taking steps to discourage the starting of new electric furnaces for the manufacture of steel. He informs us that your records show that at the present time the electric steel production is somewhat in excess of the demand.

We wish to protest vigorously against any such action on your part. As a member of the American Iron and Steel Institute, the writer was present at the spring meeting in New York, and heard J. L. Replogle make a public statement that the steel demands for building of ships, and the requirements of the Army and Navy were so great that it was very doubtful whether the entire steel production of the United States would be adequate to take care of the demand as fast as would be required. We cannot understand why conditions should have changed within the last 60 days to such an extent that you are warranted in discouraging the building of new steel capacity. The more electric furnaces placed in operation producing steel which can be turned out, either in the form of high grade alloy and tool steels or high grade steel castings, the more will the open-hearth and Bessemer capacity be available for the manufacture of plates, structural steel and the other more common grades which are so much needed, and in the steel casting field will be released similar capacity for the manufacture of heavy castings where weight is the chief essential—or for the manufacture of ingots to be rolled into finished steel.

Frequent items in the daily and technical press show that the steel shortage feared by Mr. Replogle continues to exist, and that there has been no change in conditions within the last 60 days.

We have every evidence to show that there is not enough electric steel melting capacity in the country to supply the present need for castings and high grade steels. Electric furnace steel is getting the preference over other grades, and because there is not enough electric furnace capacity, the Government has revised its specifications for steel castings to allow for a higher percentage of sulphur and make practical the use of converter and open-hearth steel for such purposes.

The furnaces sold by this company have all been for Government work. The writer has just returned from a trip to the plant of the West Michigan Steel Foundry Co., Muskegon, Mich., where one of our three-ton units has just been placed in operation. For many weeks the Navy Department has co-operated with us in every way to hasten the time when this furnace could be started, as castings were badly needed and they wished them made of electric steel. They are now impatient to have this furnace run 24 hr. per day, and could place other contracts with the same foundry if it had the electric furnace capacity.

This general condition exists with the furnaces we have at Peoria, Ill., Dayton, Ohio; Monroe and Detroit, Mich.; Chicago; Springfield, Mass., etc.

The fact that a large number of companies have solicited contracts at Washington which would require electric steel for castings or special steels may have given the impression that there was a considerable surplus electric furnace capacity. We are confident that if careful investigation were made it would disclose a large percentage of these companies have not as yet purchased their electric furnace equipment but expect to do so as soon as they secure the necessary

Government contracts. It is evident that this condition does not mean a surplus of actual electric furnace capacity but only indicates to what extent the electric furnace is recognized as the best method of making the high grade steel castings and the other special grades of steel required for Government purposes.

The electric furnace today is admitted to be the best method of making quality steel. In the steel casting field, it has eliminated the crucible and is rapidly replacing the converter. The open-hearth furnace for castings is practically restricted to the heavy casting field where weight is the chief requisite. For the manufacture of alloy and tool steels, the adoption of the electric furnace has been rapid, until to-day the better grades of these steels are all made in the electric furnace. The requirements of the Government for steels having special physical properties have been met because these could be made with the electric furnace.

In the manufacture of malleable and gray iron, the electric furnace is already demonstrating the superior quality of metal which can be produced and it is being rapidly adopted for the melting of brass and non-ferrous metals.

There is hardly a metallurgical field where the use of the electric furnace in some form is not being considered or developed.

Mr. DuBois has suggested that there is liable to be a shortage of electrodes, and for that reason the installation of new electric furnace capacity should be held back. On the other hand, we wish to point out that if the use of electric furnaces is encouraged and not discouraged, it will stimulate the electrode industry. Why not aid the present manufacturers of electrodes to increase their capacity, or encourage the formation of new companies? With Government aid, many problems much more complicated and technical than the manufacture of electrodes have been mastered and large outputs obtained. The manufacture of electrodes is quite simple by contrast and should be quickly and easily handled.

There has been for some time a shortage of ferromanganese, which is an absolute essential in the manufacture of steel. Has the Government discouraged the manufacture of steel because of this shortage? To the contrary, a careful study and investigation has been made to determine to what extent steel can be made when using lower grades of manganese alloys and other substitutes.

Your position in this matter is a vital one to us and to all other builders of electric furnaces, and for that matter to all manufacturers of electrical equipment used in the construction of electric furnaces. To have your board take such action, in the face of the recognized position of the electric furnace, and its great field of usefulness in connection with the manufacture of steel required for war materials, will be a severe setback to the development of the industry. If you continue to discourage the purchase of electric furnace equipment, we should know so promptly, so we can take steps to adapt ourselves to such conditions.

Yours very truly,

BOOTH-HALL CO.
Carl H. Booth, President.

Loaded Scrap Explodes

The Judson Iron Works, Oakland, Cal., received a carload of scrap from Arizona last week which nearly wrecked the plant. The load included a number of 3-in. and 5-in. shell cases, and some of them proved to be still loaded. The explosion of one of these shells in a furnace blew off the top of the furnace and narrowly missed doing some very serious damage. Investigation revealed 25 such shell cases in the shipment, 13 of which were loaded.

The National Tube Co. will erect the largest bridge crane ever built for ore-handling purposes, at its Lorain, Ohio plant. This will be a standard bridge crane with a 276-ft. span, 625 ft. in length over all, and 70 ft. in height to the trolley runway from the rail, and equipped with the largest size of buckets. Bridge cranes of this size have previously been built, but only for handling coal in storage yards. With the erection of this crane the National Tube Co. will have three ore-handling bridge cranes in its Lorain ore-storage yard.

The Hamilton blast furnace of the Hanging Rock Iron Co., Hanging Rock, Ohio, has been blown out because of an accident. The necessary repairs will probably keep the furnace out of blast four or five weeks.

CONDITIONS AFTER THE WAR

Reasons for Optimism and Concern as to Business and Labor

BY CHARLES LUNDBERG

In the judgment of some of those who are trying to peer into the future and measure, so far as can be done, prospects for after-war business, adjustment of labor will constitute the most difficult problem of all.

Great questions must be solved. How will inflated wages be corrected? With what fluidity will be absorbed into industry the thousands who will be turned loose from the great munitions plants and the millions released from military duty? Will the influence of the war, as with other wars, be to create a vast army of men to whom the routine of daily and steady employment at bench and machine is too irksome to endure? Will the country have a horde of rovers?

That there will be a hitherto unequalled volume of work to do seems inevitable. Stocks of manufactured articles are depleted or at low ebb, and they must be replaced, for civilization calls for their use in times of peace, if not in times of war. The railroads, great consumers of steel, will require much rehabilitation, war demands having precluded their upkeep to a point commensurate with efficiency and American pride. Great municipal and public works must go forward. Chicago, for instance, can make shift for the present with its Rush Street bridge over the Chicago River, with its winding approach up an incline, but when the war is over a new bridge should take its place as quickly as possible, thereby enabling the straightening of Michigan Boulevard and making it a safe and adequate highway. At present the 8700 tons of structural steel required cannot be spared. And the example can be duplicated many times. The lessening of non-essential production being international, it is but fair to assume that after the war will come an era of exports in volume beyond anything heretofore known. Great export corporations take this view, and are laying plans to handle this trade.

German shipbuilders, according to experts quoted in German publications, are so confident of a worldwide shortage of wood, iron and steel that they are preparing to build ferroconcrete ships after the war. And with usual self-credited German superiority they are saying that these ships will excel all others of their kind.

With all the array of reasons for business optimism, it is true that some of those who continually scan the economic horizon believe that a period of depression, short, it may be, will come with peace; and if one stops to think, that is not unlikely. The world will stop to breathe its relief, will pause and stretch itself, take stock and count the contents of its purse. A maze of adjustments will loom up, and until the commercial skies have somewhat cleared, bankers will scan credits even more closely than in war times. Incidentally there may be realizing on war bonds by those who seek capital to go ahead with normal pursuits which were discouraged in war.

Competition must be restored, so that it again may be taught that we live under the competitive system and that prices are governed by the law of supply and demand. It is safe to reckon that, given competition, lower prices will come, not only for material and manufactured products but for labor. We cannot proceed indefinitely on an artificial basis; natural laws must be permitted to work or dire results will follow. As with the human machine, we can assist nature, we cannot ignore it or go against its dictates, and expect to thrive.

A period for catching breath, under the circumstances, may be to contemplate calmly, assuming we soon forge ahead. Large numbers of the men now fighting the world's battle for liberty will return eager to take up their accustomed occupations, but will be hardly in fit physical shape to do it, and this is not including those who will return maimed or ill. Others will consider themselves entitled to a rest, and it would

be hard to say they should not have it. As it is too early to say how the Government will regulate the discharge of its troops in foreign service, their return, etc., forecasts are impossible as to the extent to which the labor market will be flooded, if this happens.

Over against the belief in a period of depression, even though brief, following the war, is the fact that never before has war been so universal, never before have so many nations been engaged in destruction, neglecting production except to prosecute war.

There can be no question that the Government will never entirely remove some of the check reins it has put on manufacture and commerce. It would be strange indeed if war experience in controlling industry did not bring out much that will be a guide for the future. War and peace have widely differing conditions and the methods applied under them must differ accordingly. Administrators must fully realize this fact. But, whatever the changes, faith in the United States is warranted as much as at any time heretofore. It is quite generally agreed that the workers are going to have more to say about the conditions under which they work, although, of course, the tendency has been steadily in this direction, and was even before the war started. Moreover, the decisions of workers as to working conditions are going to have much to do with the place American products can take in the markets of the world. There will be no government at hand, as now, buying all the output regardless of the high cost and inefficiency of labor.

American industry has a great task ahead, and one as much without precedent as our participation in the world war.

TO HELP GOVERNMENT

Survey of Foundries and Shops in New York District Begun

The first step in the canvass of manufacturers in regional district 3, comprising New York City, with surrounding counties and northern New Jersey, by the regional industrial commission of the War Industries Board, has been the organization of a committee on gray iron castings. William Fellowes Morgan, regional director, and president Merchants' Association of New York, located in the Woolworth Building, is now planning the formation of similar committees in other branches of the iron and steel industries, with a view to keeping a close check on the various lines of industry as to their ability to undertake Government work, particularly at short notice.

The committee on gray iron castings, at its meeting July 25, adopted a resolution stating that it was prepared to entertain requests from the War Industries Board for any information concerning the facilities of this district to manufacture gray iron castings.

Districts have been assigned to each member of the committee, lists of foundries are to be quickly compiled, and a brief questionnaire will be sent out for the required data. The members are: William E. Taylor, Taylor & Co., Inc., Morgan and Norman avenues, Brooklyn, chairman; William Meyers, Union Stove Works, 70 Beekman Street, New York; Arthur E. Barlow, Barlow Foundry, Inc., Newark, N. J.; J. M. Graham, Elevator Supplies Co., Inc., Hoboken, N. J.; W. G. Armstrong, Moore Brothers, Elizabeth, N. J.; John W. Burr, Burr & Houston, 84 Calyer Street, Brooklyn; J. W. Kirby, Somerville Iron Works, Somerville, N. J.; R. Richardson, Richardson & Boynton, 31 West Thirty-first Street, New York, with works at Dover, N. J.

Committees on drop forgings, other forgings, and stampings, are now being formed. Other committees planned will include aluminum, brass, and other non-ferrous castings, of which T. H. Williams of E. A. Williams & Sons, Inc., Jersey City, N. J., is chairman; also machine tools and sheet-metal-working machinery; screw machine products; other machinery, including engines, compressors, etc.; wire, and wire rope and cloth; metal tubes and tubing.

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Increasing the Man Power

When the various activities of the Government looking to the development of more man power are considered together they make a very impressive showing. Evidently few realize the extent of the work that is being done in various directions. Many strikes go unrecorded by the daily press, but those that are reported usually draw striking headlines. The strike may be settled a few days later through the good offices of the Government, but no more than a brief paragraph results in the daily press. Most people, perhaps, have heard of the War Labor Policies Board, but if so they regard its discussions as largely academic. If the War Labor Policies Board is not forgotten by the time the National War Labor Board is heard of it is probably confused with the latter. Then there are fugitive "conciliators" who have frequently appeared with remarkable promptness on the scene of an industrial dispute, but whose origin and precise functions are little understood except by those with whom contact has been forced by a dispute. A later activity, which absolutely compels the attention of many manufacturers, is the United States Employment Service, the use of which is mandatory after Aug. 1 in the case of much employment.

These and other activities all have for their ultimate and direct object an increase in the total man power that is to back up our men at the front. Such increases must be brought about by various means, hence various distinct activities are necessary. Among the ways are the following: Decreasing the power lost through men changing employment; taking men from unessential employments and putting them at war work; settling labor disputes; formulating standards of wages, hours and working conditions whereby disputes will be averted, and stimulating men to render the fullest service in employment. The foregoing is but a partial and brief résumé.

To bring together for scrutiny the more important of the Governmental activities looking to an increase in the man power backing up the military forces the following list is given:

1. The War Labor Policies Board held its first meeting May 29, its chief duties being to evolve a system of central recruiting of labor, the stand-

ardization of working conditions, the establishment of an agency through which prompt information as to labor supply may be given to industries, and the study of provisions incorporated in Government contracts affecting industrial relations. From the War Labor Policies Board has since come the United States Employment Service. Felix Frankfurter, assistant to the Secretary of Labor, is chairman of the War Labor Policies Board.

2. The National War Labor Board, of which William H. Taft and Frank P. Walsh are chairmen, was constituted by proclamation of the President April 8 to settle industrial disputes by mediation and conciliation and to provide boards in various parts of the country for local adjustments, failure of the local board to result in the parties to the dispute being summoned before the national board. The National War Labor Board has succeeded in nearly all of the many instances in which its services have been engaged, its one notable failure being in the case of the Western Union Telegraph Co.

3. The Division of Conciliation of the Department of Labor employs many conciliators, the common practice being for the individual conciliator to proceed promptly to the scene of a difficulty or impending difficulty, the essence of the operation being to "nip it in the bud." These conciliators have been quite successful, but their work has seldom attracted public attention.

4. Provost Marshal General Crowder's "work or fight" order has been productive of much good in connection with war work, and it is commonly assumed that the extension of the draft age limits now before Congress is proposed in no small part for the purpose of increasing the scope of the "work or fight" order, which, of course, automatically follows the draft age limits.

5. The United States Employment Service of the Department of Labor, under whose jurisdiction the recruiting of certain labor was placed, effective Aug. 1, is the device of the War Labor Policies Board. Through a system of divisional and local bodies it will control the recruiting of all common labor by employers engaged in war work and employing more than 100 men, and it may be surmised that its methods will be more drastic

and vigorous than a glance at its stated program would suggest.

These five are the principal Governmental activities looking to an increase in the total manpower engaged in war work, but there are many others of more or less informal character. The Shipping Board has had a number of speakers touring the country making speeches to workmen. The Fuel Administration has fathered much speech-making among coal miners and coke workers, and these are times when speech-making counts, for the speakers have something stirring to say.

Accustomed as we naturally are to regard the Government as a mass of red tape aloof from the people, the direct and efficient manner in which the Government activities are reaching out to actual contact with the sources of trouble and the spots where improvement can be effected is really amazing.

The Contract with the Railroads

The controversy between the Railroad Administration on the one hand and the railroads and owners of railroad securities in regard to the pending contract for the operation of the railroads by the Government and their return to their owners is extremely complicated, but there are some phases of it which impress even those who have not mastered the intricacies of railroad accounting.

One point on which all citizens should be able to agree is that the Government has not the right to "scramble" the railroads so that they cannot be separated without much difficulty at the end of the war. National officials have no right to make it impossible for the people of the United States to direct them what to do in regard to Government ownership or control of the railroads.

It is asserted by the attorney for the National Association of Owners of Railroad Securities that the contract provides that the railroads must never have opportunity to claim that destruction of business which has cost many millions is an item of loss or damage, and that if the physical property is handed back the covenant is satisfied.

"All the business," he says, "may have been taken away, destroyed and diverted to other roads in the process of unification. Its roundhouses may be deserted, its stations empty, roadbeds and rails unused, elevators closed down. So long as they are physically kept up and returned—vacant, without business, the good will destroyed—the covenant is supposed to be satisfied. We ask the right, at the end of the federal control, to prove, if we can, the loss or damage by reason of the destruction of our business, severance of our traffic and diversion of everything that goes to make a road of value as it has been conducted."

In reply it is claimed by the Government that there is nothing new about the leasing of one railroad line to another; that when a railroad corporation leases its property for an agreed return the return is full compensation and it does not expect to reserve the right to determine by lawsuit what damages it has sustained. It is argued that similar conditions prevail when the Government takes over the railroads.

One feature of the hearing at Washington was the presence of the entire membership of the finance committee of seventy of the National Association of Owners of Railroad Securities, assembled from all parts of the United States and representing not only individuals but insurance companies and savings banks, owning in the aggregate between six and seven billions of dollars of railroad securities. Including the policy holders, the committee represented many millions of people. It was fortunate that so many people were thus represented, for the committee could not fail to impress the officials with the fact that questions affecting railroads do not relate simply to soulless corporations, but concern in a very important way a countless number of small investors.

Having been thus impressed by the importance of the task, it would seem that the Railroad Administration ought to be able to arrive at conclusions that would carefully guard the rights of all investors and at the same time make it possible to return the railroad properties to their owners within a few months after the signing of the peace treaty. To do this, it will be necessary to base the contract on broad principles of justice and not give the lawyers any opportunity to wrangle about it. If a plan for compensating the railroads while they are in the control of the Government can be devised, it would be far better than to have endless litigation after the roads are returned to their owners.

The Crippled Soldier in Industry

As the national war effort gathers momentum, the labor market grows tighter and the search, especially for skilled artisans, more keen. It is not improbable that as ship tonnage multiplies, the exigencies of war will call for a closer combing of men from shops to be put into the service. The increasing employment of women may or may not entirely fill these vacancies. It should be borne in mind, however, that opinion abroad is against the tendency to subject future mothers to the extreme pressures the war has put upon certain industries, and any means that will reduce such a menace should be employed.

Whether women can meet the need or not, the greatest difficulty will come in replacing skilled workmen and those trained to fit into special occupations. It is well, therefore, to consider that many men in this category will soon return from the war maimed but still with capabilities that with a little training will make them a really considerable industrial asset. Their advent creates both a duty and an opportunity.

In four years of fighting 10 per cent of Canada's 350,000 men have been sent home for reconstruction, and this percentage has been found to hold among all combatant forces. With our more than 1,000,000 soldiers in France constantly being augmented and a large Navy, it is estimated that not less than 30,000 men will require assistance within the next twelvemonth to regain a livelihood. Every added year of war will increase the numbers of such cripples by tens of thousands.

Careful attention to this problem by our Allies has resulted in returning to useful occupation 80

per cent of men permanently disabled. Their success furnishes us a guide to effort that is soundly economic and at the same time humane. The importance of the matter is best recognized by those industrial managers who long ago foresaw the economic significance of welfare and safety work. Many companies are already making plant surveys to determine their share in this humanitarian undertaking. The signing by President Wilson of the bill providing for the return to civil employment of disabled soldiers and sailors has put the whole scheme in operation; yet for the full success of the Government's plans there must be enthusiastic co-operation by manufacturers. It is usual to admit as a general theory the possibility of employing cripples, but at first flush to doubt the practicability of such an innovation in the particular plant in which work is sought. The survey of the light metalworking industries by the Red Cross Institute for Crippled and Disabled Men, as published on another page, shows that actually there are few callings which require absolute physical completeness. That in some respects the cripple may prove more satisfactory than the average workman is a proposition that has never received due consideration.

The putting of the cripple back in civil life on an independent basis often arouses in him the ambition to attain a higher level than he aspired to as a normal man. Instead of doing his work less efficiently than an able-bodied man, he pays the utmost attention to his task, fortifies his skill by patience and practice, and regards his employment as something precious to be safeguarded. It is said to be an unusual thing for a sound man to replace a cripple. Labor turnover thus has less worry for the employer—a practical consideration that to a degree reinforces the motive of patriotic duty.

Defects in Steel Ingots

British research in acid open-hearth practice has been extensive and continues to be productive. This is natural since relatively Great Britain produces more of such steel than any other country. Elsewhere in this issue is given an abstract of a paper on steel ingot defects by a prominent British metallurgist who is a leader in this line of research. His contribution was one of the most important made to the May meeting of the Iron and Steel Institute in London.

The paper contains two quite important features. Mr. Kilby shows conclusively that speed in teeming bears a very important relation to the percentage of cracks or defects in the resulting products, rolled from the ingots. There is, in his opinion, a definite time per ton for any mold above which limit no cracks result but below which trouble begins, no matter how cool the steel. The possible percentage of defective material is surprising. The conclusions need to be thoroughly appreciated by all steel makers, whether acid or basic, especially in these times of speed in output. If large savings and better products are possible as a result of slower work and more care, then steel producers everywhere can benefit from a study of the British experience.

The most interesting feature of Mr. Kilby's research is its demonstration of results from the

use of lime in the slag in acid open-hearth practice. Not only does the presence of the proper amount guarantee correct bath conditions at any period of the boil and insure a more regular instead of an erratic elimination of the carbon, as well as better steel, but a distinct saving of manganese in the bath is also assured. Mr. Kilby goes so far as to say that the yield of manganese obtained in the steel in the bath from added ferro-alloys, all variables considered, is proportionate to the percentage of time in the slag or its equivalent in a similar basic material. This is a valuable suggestion in manganese conservation.

It is an interesting fact that while the benefits of the addition of lime to acid open-hearth slag has not been recognized to any extent in the United States, the practice is usual here in acid electric furnaces. Its adoption to thin the slag in such furnaces has been found eminently productive of some of the results outlined by the British authority. It is not at all unlikely that its adoption by American acid open-hearth makers eventually will be found advisable.

The spirit of research and conservation is in the air. The importance to this country of all such suggestions as are given in this important paper cannot be too strongly emphasized. It is another of the factors that are to make possible quantity production of quality steel.

Varying Paces in War Work

Possibly the idea has been entertained in some quarters that the industrial division of the American war machine could be brought to a stage at which all its departments would function in complete harmony, each operating at a speed commensurate with the speed of all other departments. If any such idea has obtained it should be dismissed. Nothing of the sort is possible, and particularly so because there is no predetermined rate at which any activity should proceed. In no part of the war work could it be said in advance that when a certain speed should be attained the rate ought not to vary afterwards. There is a desire for constant and almost unlimited growth.

Sometimes an army is spoken of as a perfectly ordered machine. From one viewpoint it is. The men are well drilled, everything is laid out according to rule, obedience is implicit and the paraphernalia are the best that can be furnished. From another viewpoint the army's functioning is altogether the reverse of efficient. The men may be practically idle for weeks and then be on active duty for 24 or 48 hours or longer at a stretch. Shots are fired at regular intervals but many are misses. Sometimes there is more ammunition than men, sometimes less. Yet an army is often used as an illustration of perfect functioning and complete efficiency.

Taking the two items of steel production and steel utilization there will always be a deficiency in the one or in the other. If the activities that consume steel, the shell factories, the shipyards, the agricultural implement works and the various other agencies, do not receive as much steel as they can fabricate or utilize, there is a shortage of steel. If there were more steel than they could

take it would not be a surplus of steel, it would be a shortage of capacity to utilize it. At the present time the question which foot the shoe is on hinges upon estimates of production and consumption. The amount of steel that will be produced can be gaged with considerable accuracy by past performance, with monthly records that extend through June. The future of consumption in war work cannot make as precise a showing since it does not have a correspondingly steady record of performance behind it.

Shipbuilding has not reached a stage of regular performance with all departments functioning with equal ease, and such a stage never will be reached. It is only a trifle more than a year ago that dependence upon the wooden ship program, because there were no steel plates, was renounced. Now plates are being furnished at the rate of several million tons a year. A few weeks ago the Director General of Shipbuilding announced to a Congressional committee that he had no fears as to the steel supply for shipbuilding, but he did have fears as to the supply of equipment, the various appurtenances. Presumably he was gaging the prospective supply of equipment, the thousand and one things required for the ship after it has left the ways, in accordance with the prospective rate of launchings. Since then announcement has been made of new expectations entertained whereby the launching of ships can be materially speeded up, more ships per shipway per year. There is no assurance that the delivery of engines and boilers and other appurtenances can be speeded up correspondingly. First there were more plates than shipways. Then for a while it appeared there were more shipways than plates. Next there may be more hulls than equipment. All this is in the nature of things. No more blame attaches to the thing that is scarce than to the thing that is plentiful, for it is impossible to order them all perfectly. The greater the success of one effort the greater the apparent failure of the other. All that can be done is to seek to minimize the divergences in pace between the different activities.

Discontinues Business to Build Ships

The Baily & Allen Co., 122 South Michigan Avenue, Chicago, makes the following announcement:

On Aug. 1 our organization is leaving Chicago to engage in the construction of steel ships for the Emergency Fleet Corporation.

Owing to this fact we will discontinue, during the war, our Chicago office, and are pleased to advise you that we have made arrangements with George Gibbs, First National Bank Building, Milwaukee, Wis., to take care of our customers.

For past favors, we thank you. We will be back and renew our business relations with you after the Hun has received in full measure the many surprises Uncle Sam has in store for him.

The members of the firm are M. E. Allen, structural engineer, now of the Mobile Shipbuilding Co., Mobile, Ala., and R. W. Baily, M. E., now of the Birmingham Steel Corporation, Birmingham, Ala.

The Lakewood Engineering Co., Cleveland, is enlarging its raw material and finished stock warehouse by an extension which will make this building 75 x 600 ft. It will be equipped with a 10-ton electric traveling crane. This company has just finished a new building 100 x 100 ft. to be used for its punch press and shear department.

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Steel Corporation Again Advances Wages

Judge Elbert H. Gary, chairman of the United States Steel Corporation, made the following announcement Tuesday afternoon:

The Finance Committee of the United States Steel Corporation, after due consideration, has unanimously voted to increase the wage rates of day labor at the manufacturing plants about ten per cent, to become effective August 1 proximo. Other wage rates will be equitably adjusted, except in cases where advances have been made recently. Coal mining companies are not included. Their employees heretofore received similar advances.

This is the seventh advance in wages since Jan. 1, 1916, the previous advances being as follows: 10 per cent, effective Feb. 1, 1916; 10 per cent, effective May 1, 1916; 10 per cent, effective Dec. 15, 1916; 10 per cent, effective May 1, 1917; 10 per cent, effective Oct. 1, 1917; 15 per cent, effective April 15, 1918.

The plants of the Garland Nut & Rivet Co. and the Safety Armorite Co., West Pittsburgh, near New Castle, Pa., will be sold by the Fidelity Title & Trust Co., Pittsburgh, on August 14. The works include a number of factory buildings.

Changes in Price Regulations Announced

High Silicon Charcoal Iron Advanced— Changes in Specifications on Some Finished Materials—Modifications as to Chrome Ore

As chairman of the Committee on Steel and Steel Products of the American Iron and Steel Institute, Judge Gary made a number of announcements Tuesday afternoon. The schedule of charcoal iron is changed so that for silicon up to 2 per cent, the price is \$17 per gross ton above base instead of \$10 per gross ton as provided in the announcement of May 21. A new section is added to the price schedule which provides that Muirkirk charcoal iron shall have a maximum price of \$37 per gross ton above base.

The cast iron pipe schedule as to New York and Chicago is changed to conform to the recent advance in freight rates.

Slight changes are made in the regulations as to specifications for steel plates for the Navy, seamless boiler tubes and seamless mechanical tubing. The statements in full follow:

Pig Iron

Charcoal Iron

Cancel the sentence under Southern or Warm Blast Charcoal Iron in the announcement of May 21, 1918, reading:

"For silicon up to 2 per cent, a maximum of \$10 per gross ton above base,"

and substitute the following:

"For silicon up to 2 per cent, a maximum of \$17 per gross ton over base."

Add to the section on charcoal iron, the following:

"Muirkirk charcoal iron, a maximum of \$37 per gross ton above base."

This should follow immediately after the paragraph on Lake Superior iron.

Under Steel Bars, specifications and inspection, p. 22, and Steel Structural Shapes, p. 32, institute pamphlet of January, 1918, cancel the following:

"Material subject to Navy Department inspection 10c. extra"

and substitute the following:

"Material subject to Navy Department specifications and inspection 10c. extra."

Steel Plates

Under "Grades," p. 34, institute pamphlet of January, 1918, cancel

"Material subject to Navy Department inspection 10c. extra"

and substitute the following:

"Material subject to Navy Department specifications and inspection 10c. extra."

To the paragraph on sketch plates in the announcement of May 21, 1918, add the following:

NOTE.—The "rectangular plate price" at which the difference is to be invoiced after allowing for scrap, is held to be the net price f.o.b. mill which the maker would have realized had the rectangle been shipped to same destination as the sketch cut from it. Such price is properly figured by adding to the Pittsburgh base price the full extras for size, gage, quality and cutting to length, and the carload freight rate from Pittsburgh to destination; and then deducting the carload freight rate from maker's mill to destination.

At the bottom of p. 34, institute pamphlet of January, 1918, add the following:

Freights

All-rail freights in effect at time of shipment will be used in determining the delivered price.

Cast Iron Water Pipe

Change base prices f.o.b. New York and f.o.b. Chicago, as given in announcement of May 21, 1918, to read as follows:

\$55.00 f.o.b. Birmingham, Ala.
62.70 f.o.b. New York.
61.80 f.o.b. Chicago.

such change to be effective on and after June 25, 1918, until further notice.

Chrome Ore

My announcement of May 21 with respect to the grades of chrome ore available for refractory purposes stated that no ore containing more than 38 per cent chromic oxide or averaging more than 35 per cent chromic oxide should be used for these purposes. A letter from the secretary of this committee to the manufacturers of chrome brick and chrome cement called their attention to the fact that the above recommendation was intended to apply to chrome ore for use in the manufacture of chrome brick and chrome cement.

Producers and dealers in chrome ore have advised the Sub-Committee on Ferro Alloys that in view of the higher prices being paid for the higher grades of the ferroalloys and chemical trades, sufficient quantities of chrome ore running below 38 per cent will probably not be available to meet the requirements of the refractories trade to the extent recommended in my announcement of May 21. To meet these conditions, it has been recommended that the chromic oxide limits for refractory uses be increased, and it will therefore be in order, until further notice, for users of chrome ores for refractory purposes, including the manufacture of chrome brick and chrome cement, to purchase and use chrome ore for these purposes running not over 43 per cent chromic oxide and averaging not over 40 per cent chromic oxide, each carload to be considered as a separate unit for analysis.

Seamless Steel Tubes

Referring to previous statements of the chairman of the Committee on Steel and Steel Products of the American Iron and Steel Institute recommending prices for certain steel products to be adopted as maximum prices, to take effect immediately, to apply to the requirements of the United States Government, to the war requirements of the Allies and for domestic consumption within the United States, the committee now makes a similar recommendation in respect of the prices and differentials below stated:

Standard Commercial Seamless Boiler Tubes Cold Drawn or Hot Rolled

	No.	No.	Per Net Ton
1 in.	O.D. x 13 to 10 B.W.G.		\$340.00
1 1/4 in.	O.D. x 13 to 10 B.W.G.		340.00
1 1/2 in.	O.D. x 13 to 10 B.W.G.		280.00
1 3/4 in.	O.D. x 13 to 10 B.W.G.		270.00
2 in.	O.D. x 13 to 10 B.W.G.		220.00
2 1/2 in.	O.D. x 13 to 10 B.W.G.		190.00
2 3/4 in.	O.D. x 12 to 9 B.W.G.		180.00
3 in.	O.D. x 12 to 9 B.W.G.		180.00
3 1/2 in.	O.D. x 11 to 8 B.W.G.		200.00
4 in.	O.D. x 10 to 7 B.W.G.		220.00
4 1/2 in.	O.D. x 10 to 7 B.W.G.		220.00
5 in.	O.D. x 9 to 6 B.W.G.		220.00

Cancel the schedule of standard commercial seamless boiler tubes, on page 38 of the institute pamphlet of January, 1918, including the revised notation as given in the announcement dated May 21, 1918, under

the heading of "Seamless Steel Tubes," and substitute the following: [This schedule is reproduced on page 290.—EDITOR.]

For gages heavier than specified above add \$8 per net ton to prices stated, also adding 10 per cent to theoretical weight of tube in question.

Above prices for carload lots f.o.b. Pittsburgh.

To arrive at net delivered prices per foot on carload quantities, use approximate manufacturing weight per foot, multiplying by above prices per pound plus Pittsburgh freight to destination.

For less than carload quantities add \$8.00 per net ton to above prices. On less than carload quantities, prices are usually quoted net per foot f.o.b. Pittsburgh.

Sizes smaller than 1 in. O.D., or lighter than specified above, are sold at mechanical tube list, less 75 per cent base discount, and subject to mechanical tube cutting charges.

The above prices and conditions apply to seamless boiler tubes, other than locomotive, ordered to A.S.M.E., A.S.T.M., Lloyd's, United States Navy 44-T-8c, of Sept. 1, 1917, and similar specifications.

For tubes to special United States Government, or similar specifications (for example, U. S. Navy 44-T-3b or 44-P-9b), 78 per cent base discount from seamless mechanical tube list for random lengths, plus 20 per cent.

Seamless Mechanical Tubing

Mechanical tubes—1/2 in. O.D. to 5 1/2 in. O.D. to standard specifications, made from 0.10 per cent to 0.20 per cent carbon steel, in random lengths... 75 per cent base discount
Mechanical tubes—1/2 in. O.D. to 5 1/2 in. O.D. made from 0.10 per cent to 0.20 per cent carbon steel, to U. S. Government or similar specifications, in random lengths.....
..... 78 per cent base discount plus 20 per cent

Except as follows:

1/2 in. O.D. to 1 3/8 in. O.D. inclusive, No. 20 BWG., 45 per cent base discount

1/2 in. O.D. to 1 3/8 in. O.D. inclusive, No. 18 BWG., 58 per cent base discount

For other than 0.10 to 0.20 per cent carbon steel the above base discounts to be reduced as follows:

0.20 to 0.30 per cent carbon steel..... 2 points

0.30 to 0.40 per cent carbon steel..... 4 points

0.40 to 0.50 per cent carbon steel..... 14 points

To arrive at net discounts all base discounts are reduced by the number of points indicated in following table for each size of gage (for example—1/2 in. x No. 11 gage, lower base discount by 26 points). [See table of differential discounts on this page.—Editor.]

Cutting.—Tubes not over 18 ft. long, cut to specified lengths, to be charged for at not to exceed the following schedule in dollars per 100 pieces:

TABLE OF DIFFERENTIAL DISCOUNTS

Thick. B.W.G. and fractions	Equivalent in decimal of inch	OUTSIDE DIAMETER IN INCHES															
		1/2	3/8	1/4	3/16	1	1 1/8	1 1/4	1 3/8	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4
20	0.035	50	45	40	35	31	27	25	25	25	25	25	25	25	25	25	25
18	0.049	45	38	35	31	27	22	20	19	18	17	15	14	13	12	11	11
16	0.065	41	34	31	27	25	20	17	15	14	13	12	10	9	7	6	5
14	0.083	35	29	25	23	21	18	15	12	10	9	7	6	5	4	3	2
13	0.095	31	27	23	20	18	16	13	10	8	7	4	3	2	1	1	1
12	0.109	30	25	21	18	16	14	11	8	6	5	2	1	1	1	1	1
11	0.120	28	24	20	17	15	13	9	7	5	3	1	1	1	1	1	1
10	0.134	23	18	16	14	12	8	6	4	2	1	1	1	1	1	1	1
5/32	0.156	17	15	13	10	7	5	3	1	1	1	1	1	1	1	1	1
3/16	0.188	15	13	11	9	6	4	2	1	1	1	1	1	1	1	1	1
7/32	0.218	11	9	7	4	2	1	1	1	1	1	1	1	1	1	1	1
1/4	0.250	8	6	3	1	1	1	1	1	1	1	1	1	1	1	1	1
5/16	0.312	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3/8	0.375	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Sizes smaller than 1/2 in. O. D. and lighter than No. 20 B.W.G., subject to negotiation.

Ferromanganese Users Urged to Buy Ahead

The following has been sent out to consumers of ferromanganese by the Sub-Committee on Ferroalloys, J. A. Farrell, chairman, urging them to cover their requirements as far in advance and as soon as possible:

"From time to time the shortage of ocean shipping threatens the steel industry of the country with a serious curtailment of the supply of foreign high grade manganese ore used for the production of ferromanganese. In this crisis, the American Iron and Steel Institute has undertaken to secure the co-operation of the trade with the Government in an endeavor to save ocean tonnage by stimulating the production of domestic ores and making the changes in practise necessitated by the lower grades of ore available in this country. The makers of ferromanganese are doing all in their power to carry out this plan. In order to insure the production of a steady and adequate supply of domestic ores, it is necessary for them to make commitments many months ahead. The policy of hand to mouth purchasing will not bring out the quantities of ore necessary to safeguard the industry.

"In order that this program may be successfully carried out, it is necessary for the consumers of ferromanganese to make commitments for their requirements reasonably in advance. Otherwise, the situation, which is not over secure to-day, will rapidly become

Gage	Equivalent in decimal of inch	OUTSIDE DIAMETER IN INCHES																							
		1/2	3/8	1/4	3/16	1	1 1/8	1 1/4	1 3/8	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5	5 1/4
20	0.035	1.50	1.52	1.54	1.56	1.58	1.60	1.62	1.64	1.68	1.70	1.78	1.88	2.08	2.16	2.26	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24
18	0.049	1.52	1.56	1.58	1.62	1.66	1.68	1.72	1.76	1.78	1.88	1.98	2.08	2.16	2.26	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24
16	0.065	1.54	1.60	1.64	1.68	1.74	1.76	1.82	1.86	1.90	1.98	2.08	2.16	2.26	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24
14	0.083	1.58	1.64	1.70	1.74	1.82	1.86	1.92	1.96	2.02	2.14	2.24	2.36	2.50	2.62	2.76	2.88	3.00	3.14	3.28	3.42	3.56	3.70	3.84	3.98
13	0.095	1.62	1.68	1.74	1.80	1.86	1.92	2.00	2.06	2.12	2.24	2.36	2.50	2.62	2.76	2.88	3.00	3.14	3.28	3.42	3.56	3.70	3.84	3.98	4.12
12	0.109	1.64	1.70	1.78	1.86	1.92	2.00	2.08	2.14	2.22	2.36	2.50	2.62	2.76	2.88	3.00	3.14	3.28	3.42	3.56	3.70	3.84	3.98	4.12	4.26
11	0.120	1.66	1.74	1.84	1.90	1.98	2.06	2.14	2.22	2.30	2.46	2.62	2.78	2.94	3.10	3.26	3.42	3.58	3.74	3.90	4.06	4.22	4.38	4.54	4.70
10	0.134	1.76	1.84	1.94	2.02	2.12	2.20	2.30	2.38	2.56	2.74	2.92	3.10	3.28	3.46	3.64	3.82	4.00	4.18	4.36	4.54	4.72	4.88	5.06	5.24
5/32	0.156	1.90	2.00	2.12	2.20	2.32	2.42	2.52	2.62	2.74	2.94	3.16	3.36	3.56	3.78	3.98	4.20	4.40	4.62	4.82	5.02	5.24	5.44	5.64	5.84
3/16	0.188	1.96	2.08	2.22	2.34	2.48	2.60	2.72	2.98	3.22	3.48	3.72	3.98	4.22	4.48	4.72	4.98	5.22	5.48	5.72	5.98	6.22	6.48	6.72	6.98
7/32	0.218	2.16	2.30	2.46	2.62	2.76	2.90	3.08	3.20	3.48	3.78	4.06	4.36	4.66	4.94	5.24	5.52	5.82	6.12	6.40	6.70	6.98	7.28	7.56	7.84
1/4	0.250	2.40	2.58	2.74	2.90	3.08	3.40	3.74	4.08	4.40	4.74	5.08	5.40	5.74	6.08	6.40	6.74	7.08	7.40	7.74	8.08	8.40	8.74	9.08	9.40
5/16	0.312	2.98	3.16	3.38	3.60	3.80	4.22	4.64	5.06	5.46	5.88	6.30	6.72	7.14	7.56	7.98	8.38	8.80	9.22	9.64	10.06	10.48	10.90	11.32	11.74
3/8	0.375	3.16	3.40	3.66	4.16	4.66	5.16	5.66	6.16	6.66	7.16	7.66	8.16	8.66	9.16	9.66	10.16	10.66	11.16	11.66	12.16	12.66	13.16	13.66	14.16
7/16	0.437	3.36	3.60	3.88	4.38	4.88	5.38	5.88	6.38	6.88	7.38	7.88	8.38	8.88	9.38	9.88	10.38	10.88	11.38	11.88	12.38	12.88	13.38	13.88	14.38
1/2	0.500	4.08	4.76	5.40	6.08	6.74	7.40	8.08	8.74	9.40	10.08	10.74	11.40	12.08	12.74	13.40	14.08	14.74	15.40	16.08	16.74	17.40	18.08	18.74	19.40
5/8	0.625	5.40	6.08	6.74	7.40	8.08	8.74	9.40	10.08	10.74	11.40	12.08	12.74	13.40	14.08	14.74	15.40	16.08	16.74	17.40	18.08	18.74	19.40	20.08	20.74
3/4	0.750	6.00	6.82	7.66	8.50	9.32	10.16	11.00	11.84	12.68	13.52	14.36	15.20	16.04	16.88	17.72	18.56	19.40	20.24	21.08	21.92	22.76	23.60	24.44	25.28
7/8	0.875	6.00	6.82	7.66	8.50	9.32	10.16	11.00	11.84	12.68	13.52	14.36	15.20	16.04	16.88	17.72	18.56	19.40	20.24	21.08	21.92	22.76	23.60	24.44	25.28
1	1.000	6.00	6.82	7.66	8.50	9.32	10.16	11.00	11.84	12.68	13.52	14.36	15.20	16.04	16.88	17.72	18.56	19.40	20.24	21.08	21.92	22.76	23.60	24.44	25.28

Boxing.—If necessary to ship tubes boxed, the following maximum schedule may be charged:

Box requiring	1 to 10 ft. of lumber.....	\$0.50 each
"	11 to 20 " " " " " "	1.00 "
"	21 to 30 " " " " " "	1.50 "
"	31 to 40 " " " " " "	2.00 "
"	41 to 50 " " " " " "	2.50 "
"	51 to 60 " " " " " "	3.00 "
"	61 to 70 " " " " " "	3.50 "
"	71 to 80 " " " " " "	4.00 "
"	81 to 90 " " " " " "	4.50 "
"	91 to 100 " " " " " "	5.00 "

Delivery.—All above prices on mechanical tubing cover delivery f.o.b. maker's mill.

acute and the steel industry may face an actual shortage. It is therefore apparent that consumers of ferromanganese should continue their usual custom of covering their requirements in advance for a considerable period of time. Only in this way can the maintenance of a steady and sufficient supply be assured. Please advise as to your situation so that the committee may be in an intelligent position."

The M. Speer Iron & Metal Co., Sharon, Pa., dealer in scrap, has opened an office at Cleveland. Max Pressler will be in charge.

Iron and Steel Markets

MORE STEEL FOR SHIPS

Program to Be Insured Against Interruption

Pig Iron Sales for 1919 Not in Favor—Jobbers' Steel Supply for August

A conference in New York Monday between Government leaders in shipbuilding, the Director of Steel Supply and the steel manufacturers' committee had to do with means of increasing the allotment of steel to shipyards, in view of the enlarging program for the Schwab drive. At a meeting in Washington later in the week, plans will be made to insure shipyard work against interruption in the coming year, also for the prevention of lost motion through competing efforts of Washington departments, the commanding general in France and the Allies.

The whole tenor of the conference talk was that however detailed figures might be changed, the main fact was the increasing war demand for steel and with it an indefinite but inevitable reduction in the amount available for other uses.

The large schedules of steel for direct and indirect war needs give weight to the claim still widely made that all Governmental agencies concerned have put their requirements at top figures, in spite of repeated requests for pruning. In short, if deliveries meet schedule figures, it is believed the reservoir would be an ever filling one, unless the talked-of railroad breakdown should be really serious. The half-year's demand for shell steel has risen to 3,000,000 tons, requiring a shipment rate probably 15 per cent above that now obtaining, and the plate total is close to theoretical capacity and about 12 per cent more than the recent record outputs.

The Steel Corporation's net earnings of \$62,500,000 in the second quarter, plus nearly \$91,000,000 set aside for Federal taxes, make a total 70 per cent greater than a similar total for the first quarter, with its drastic shutdowns in January and February. The exhibit, even with the lavish allowance for war taxes, is striking testimony to the earning power of a great integrated producer on the present scale of Government-made prices. Evidently the quarter included some deliveries at the higher prices ruling before steel control set in last September.

The 10 per cent wage increase announced by the Steel Corporation was a surprise to the independent companies, from which like action may be expected as heretofore. Five other 10 per cent advances in the past 30 months and one of 15 per cent make the new wage 103 per cent higher than that paid on Jan. 1, 1916. The Steel Corporation pace of wage increase adds to the problem of some small producers, who are pinched by Government prices

on which the corporation can make large profits.

Washington has come to the help of the jobbers, many of whom were left with small stocks owing to poor deliveries in recent months. For August the Director of Steel Supply permits them to receive from the mills shipments equal to their average in the first six months of the year. Beginning with September, however, the War Industries Board's plan becomes effective, permitting the replacement each month of the amount shipped by the jobber from stock for Government and essential purposes in the preceding month.

With all that has been said lately of the increasing demands of the war program upon steel output, specific new tonnages are not plentiful. Structural work for the Mare Island Navy Yard calls for 6200 tons. It is reported that the Government will place 10,000 small cars for France, each taking four or five tons of steel. There is also mention of 500 locomotives placed for France, deliveries to be at the rate of 25 each week, beginning in August.

Though no direct ruling has been made, the War Industries Board is not favorable to the selling of pig iron for 1919 delivery. Several furnace interests have been conspicuous for such sales and one or two have sold largely. What bearing the official attitude on the matter may have on possible changes in the plan of Government control is already discussed.

The Government's hand is seen in plans for concentrating production of certain alloying metals, as molybdenum, tungsten and chromium, so that competition for raw materials may be lessened or eliminated. Important developments in this direction are pending.

A new Government allocation involves 70,000 tons of plates for corrugated ends of box cars.

Discard shell steel is being taken up for a variety of uses, as light rails, reinforcing bars, and in implement and automobile work. At the same time there are accumulations of such steel which, because of the high carbon, cannot be readily utilized and now amount to a very considerable tonnage.

Pittsburgh

PITTSBURGH, July 30.—(By Wire).

While shipments of steel products to the more important of the war activities have been at a very heavy rate, it is not admitted in any quarter that there are any prospects of any of these activities being oversupplied. Cases in which mills have been instructed to cease shipping war steel to one plant and ship instead to another are interpreted not as indicating that the first activity has a surplus but that the second is deficient. The steel trade is taking in all seriousness the recent statement of the War Industries Board that the steel requirements for the second half of the year total 20,000,000 net tons and is accordingly prepared for a hard struggle to meet the requirements as far as possible. At the same time it is pointed out that no precise estimates of requirements are possible because conditions are changing constantly and the programs of some of the steel-consuming war activities are ambitious. None of the details of the 20,000,000-ton pro-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 30 1918	July 23 1918	July 2 1918	Aug. 1 1917
No. 2 N. Philadelphia....	\$34.40	\$34.40	\$34.40	\$53.00
No. 2 Valley furnace....	33.00	33.00	33.00	53.00
No. 2 Southern, Cincinnati.	36.90	36.90	36.90	49.90
No. 2 Birmingham, Ala....	33.00	33.00	33.00	47.00*
No. 2 furnace, Chicago*....	33.00	33.00	33.00	55.00
Basic, deliv., eastern Pa....	32.90	32.90	32.90	50.00
Basic, Valley furnace....	32.00	32.00	32.00	52.00
Bessemer, Pittsburgh....	36.60	36.60	36.60	55.95
Malleable Bess., Chicago*....	33.50	33.50	33.50	55.00
Malleable, Bessemer....	33.50	33.50	33.50	53.00
Gray forge, Pittsburgh....	33.40	33.40	33.40	46.95
L. S. charcoal, Chicago....	37.85	37.85	37.85	58.00

Rails, Billets, etc., Per Gross Ton:	July 30 1918	July 23 1918	July 2 1918	Aug. 1 1917
Bess. rails, heavy, at mill.	55.00	55.00	55.00	38.00
U. S. rails, heavy, at mill.	57.00	57.00	57.00	40.00
Bess. billets, Pittsburgh.	47.50	47.50	47.50	100.00
U. S. billets, Pittsburgh....	47.50	47.50	47.50	100.00
U. S. sheet bars, P'gh....	51.00	51.00	51.00	105.00
Forging billets, base, P'gh.	60.00	60.00	60.00	125.00
U. S. billets, Philadelphia.	51.30	51.30	51.30	110.00
Wire rods, Pittsburgh....	57.00	57.00	57.00	95.00

Finished Iron and Steel, Per Lb. to Large Buyers: Cents	Cents	Cents	Cents	Cents
Iron bars, Philadelphia....	3.73	3.73	3.73	4.659
Iron bars, Pittsburgh....	3.50	3.50	3.50	4.75
Iron bars, Chicago....	3.50	3.50	3.50	4.50
Steel bars, Pittsburgh....	2.90	2.90	2.90	4.50
Steel bars, New York....	3.145	3.145	3.145	4.669
Tank plates, Pittsburgh....	3.25	3.25	3.25	9.00
Tank plates, New York....	3.495	3.495	3.495	10.169
Beams, etc., Pittsburgh....	3.00	3.00	3.00	4.50
Beams, etc., New York....	3.245	3.245	3.245	4.669
Skelp, grooved steel, P'gh.	2.90	2.90	2.90	4.00
Skelp, sheared steel, P'gh.	3.25	3.25	3.25	6.00
Steel hoops, Pittsburgh....	3.50	3.50	3.50	5.75

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, July 30 1918	July 23 1918	July 2 1918	Aug. 1 1917
Per Lb. to Large Buyers: Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	5.00	5.00	5.00
Sheets, galv., No. 28, P'gh.	6.25	6.25	10.00
Wire nails, Pittsburgh....	3.50	3.50	4.00
Cut nails, Pittsburgh....	4.00	4.00	4.65
Fence wire, base, P'gh....	3.25	3.25	3.95
Barb wire, galv., P'gh....	4.35	4.35	4.85

Old Material, Per Gross Ton:	July 30 1918	July 23 1918	July 2 1918	Aug. 1 1917
Carwheels, Chicago....	\$29.00	\$29.00	\$29.00	\$30.50
Carwheels, Philadelphia....	29.00	29.00	29.00	35.00
Heavy steel scrap, P'gh....	29.00	29.00	29.00	33.00
Heavy steel scrap, Phila....	29.00	29.00	29.00	32.00
Heavy steel scrap, Ch'go....	29.00	29.00	29.00	29.00
No. 1 cast, Pittsburgh....	29.00	29.00	29.00	34.00
No. 1 cast, Philadelphia....	29.00	29.00	29.00	35.00
No. 1 cast, Ch'go, net ton.	28.25	28.25	28.00	27.00
No. 1 RR. wrot., Phila....	34.00	34.00	34.00	45.00
No. 1 RR. wrot., Ch'go, net	29.75	29.75	29.75	33.50

Coke, Connellsville, Per Net Ton at Oven:	July 30 1918	July 23 1918	July 2 1918	Aug. 1 1917
Furnace coke, prompt....	\$6.00	\$6.00	\$6.00	\$10.00
Furnace coke, future....	6.00	6.00	6.00	10.00
Foundry coke, prompt....	7.00	7.00	7.00	12.00
Foundry coke, future....	7.00	7.00	7.00	10.00

Metals, Per Lb. to Large Buyers: Cents	Cents	Cents	Cents	Cents
Lake copper, New York....	26.00	26.00	23.50	29.00
Electrolytic copper, N. Y....	26.00	26.00	23.50	29.00
Spelter, St. Louis....	8.00	8.37 1/2	8.62 1/2	8.50
Spelter, New York....	8.25	8.62 1/2	8.87 1/2	8.75
Lead, St. Louis....	7.75	7.75	7.75	10.75
Lead, New York....	8.05	8.05	7.90	10.87 1/2
Tin, New York....	94.00	94.00	92.00	63.75
Antimony (Asiatic), N. Y....	13.00	13.25	13.00	15.00
Tin plate, 100-lb. box, P'gh	\$7.75	\$7.75	\$7.75	\$12.00

gram have been made public and it is improbable that details will be furnished at any time. The steel trade depends for its information chiefly upon the orders that are placed from time to time, and in this connection a large increase in the shell program is noted, even though of late shell steel has been made and shipped at a rate not far from half a million net tons a month. Production prospects are materially improved, for the iron and steel industry is now about half through the hot midsummer period without having experienced any noticeable slowing down in tonnage output. Temperature at Pittsburgh this month has averaged 2 deg. below normal and the days of extremely hot weather have been few.

A more important influence in maintaining production, however, is the spirit the workmen have been showing as a result of the propaganda of the furnaces and mills, urging them as a war duty to remain faithfully at their work. Indeed, labor conditions in general have been much more satisfactory in the past few weeks than was expected. The industry expects to be benefited materially by the United States Employment Service through which all labor for war work is to be recruited, beginning Aug. 1. It is believed there will be very important withdrawals of labor from non-essential occupations.

In the past few days, the War Industries Board has promulgated additional regulations relating to steel for jobbers. The original regulations provided that jobbers should distribute their supplies in accordance with the preference list that is in force with the steel mills and should be entitled to replacement of steel so distributed. The new regulation provides that mills shall ship to jobbers during August quantities of steel equal to the average monthly tonnage shipped during the first half of this year, such steel being given a priority of class B4. For September and later months, it appears the distribution is to be according to the tonnage furnished in the same month a year previous. Some of the mills expect to be able to carry out the regulations applying to August, but a number of them insist that this will be impossible, as it is necessary for them to schedule the orders some time in advance of the actual shipment. Some of the mills also find them-

selves in a dilemma as to what degree of precedence they should give this material, for while it is prescribed to be priority B4 if it is absolutely essential that it be shipped during August, it really takes a precedence over all the priorities. The matter will probably work out by the various mills giving the material such preference as individual circumstances permit.

Pig Iron.—Allocations of pig iron have been fewer the past week, but these allocations usually come in spells and furnaces expect to receive allocations in future at about the rate hitherto obtaining, and possibly the allocations will increase, as a very conservative sales policy has been followed by all the furnaces of late and many consumers are likely to apply to Washington for iron. Very few allocations are made by the committee without the War Industries Board having first given its sanction. There has been a moderate selling movement in pig iron for the first half of next year during the past fortnight. One large interest made considerable sales last week, but is now practically out of the market while some others have come in within the past few days. Sales are made only to regular customers and those who have a standing well up in the preference list, the furnaces preferring not to take chances with buyers whose wants might not be recognized in Washington, and in all cases the iron sold for the half year totals much less than the prospective production. Of ordinary market sales for early delivery, there are very few prospective buyers being required to secure an allocation. We quote:

Basic pig iron, \$32; Bessemer, \$35.20; gray forge, \$32; No. 2 foundry, \$33; No. 3 foundry, \$32.50, and malleable, \$33.50, all per gross ton at Valley furnace, the freight rate for delivery in the Cleveland and Pittsburgh districts being \$1.40 per ton.

Billets and Sheet Bars.—There has been no improvement in the supply of sheet bars, but there is a better distribution among the sheet mills whereby the great majority are receiving a supply equal to about 60 per cent of their full requirements. The tin plate mills are fully supplied through the system of allotment recently put into operation. There is practically no soft steel billet tonnage available in the open market and priority orders for this material are rare, as the

mills producing billets can consume them in making essential products or are already supplying them to finishing mills engaged in the same work. While shell discard steel is subject to shipment by permit when any is available, the War Industries Board has worked out such a system for using this steel in the filling of war orders for which it can be used that there is very little, if any, surplus. With the increased production of shell steel that is in prospect, there may be more discard steel made, but further employment may be found for the steel in filling Government orders.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$47.50, sheet bars \$51, forging ingots \$73, and forging billets \$60 base, all f.o.b. at mill, Pittsburgh or Youngstown.

Ferroalloys.—Demand for ferromanganese and spiegeleisen is very light, and consumers appear to be well covered for months to come. Producers are equally well sold up. There is a fair business being done in small lots. Fears that there will be an acute shortage of ferromanganese have been allayed, as it has become more apparent that the Government has been watching the situation.

We quote 70 per cent ferromanganese at \$250 delivered, 16 per cent spiegeleisen at \$75 at furnace and 50 per cent ferrosilicon for prompt shipment at \$160 and for delivery over the last half of the year, \$150 to \$155 at furnace, the furnaces usually absorbing the freight.

We now quote 9 per cent Bessemer ferrosilicon at \$54; 10 per cent, \$55; 11 per cent, \$58.30; 12 per cent, \$61.60. We quote 6 per cent silvery iron, \$41; 7 per cent, \$43; 8 per cent, \$45.50; 9 per cent, \$47.50; 10 per cent, \$50. Three dollars per gross ton advance for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, these furnaces having a uniform freight rate of \$2 per gross ton, for delivery in the Pittsburgh district.

Structural Material.—The Shipping Board is endeavoring to effect further speeding up in shipbuilding and requirements in structural shapes for fabricating plants serving the shipyards are increasing. The major portion of the structural shapes now being rolled is for ships. While some of the Government orders for structural steel for storage warehouses and other purposes have appeared impressive, the mills state that the total tonnage has been small by comparison with the ship steel requirements and that most of the large orders have already been completed. We quote beams and channels up to 15-in. at 3c. at mill, Pittsburgh, for third quarter delivery.

Plates.—Shipments of plates, chiefly Bessemer for the 100,000 freight cars recently placed by the Railroad Administration, are going forward in fair volume and the expectation is that virtually all the cars will be completed before the end of the year. Additional freight car orders are likely to be placed shortly, but except for cars that are needed abroad, no particular pressure will be exerted to have them completed early, as the excellent performance of the railroads of late has confirmed the view entertained in many quarters that the railroads needed locomotives much more than cars and has shown also that the restrictions upon pooling that were removed by the Government taking over the railroads had prevented the physical properties from exhibiting their full efficiency. The Shipping Board continues to exert pressure for maximum shipments of plates to shipyards and the fabricating plants serving them. The new plate rolling capacity that will come into operation shortly in the Youngstown district will readily be absorbed and there is little, if any, prospect of plates becoming more plentiful for the general trade. We quote quarter inch and heavier sheared plates for third quarter delivery at 3.25c. at mill, Pittsburgh.

Iron and Steel Bars.—The merchant steel bar mills are operating at various rates according to the amount of steel allotted to them, the general average being probably between 60 and 70 per cent. Some of the smaller mills are operating at very light rates, other and larger mills in the same department being given more steel as their product is regarded as more essential. With the limited supply of bars available, the question of distribution is a difficult one and it is feared that some shortage in manufactured goods more or less helpful to winning the war will eventually result, as these manufactured goods are so far removed from

the steel mills that preference cannot be given in the matter of supply. The iron mills are running at considerably less than capacity, and are not doing a great deal apart from filling Government orders direct and indirect. We quote soft steel bars rolled from billets at 2.90c., from old steel rails, 3c. and refined iron bars 3.50c. at mill Pittsburgh for third quarter delivery.

Sheets.—Under the system of distributing sheet bars to sheet mills recently adopted, nearly all the sheet plants are receiving substantially the same proportion of their requirements. The great majority are now operating at between 60 and 65 per cent of capacity. As Government orders for sheets have been allotted about equally, the various mills in accordance with their capacity, this equal distribution of steel enables each mill to give about the same amount of attention to commercial trade represented on the preference list. From the present outlook it is improbable there will be much, if any, sheet tonnage available for purposes not accorded preference. Prices on sheets are given in detail on page 305.

Wire Rods.—The rod mills continue to operate at an average of about 60 per cent of capacity, their operations being limited by the amount of steel available. Scarcely any rod tonnage is available except for preference uses. Prices on rods for third quarter are given on page 305.

Wire Products.—The wire mills are not altogether clear as yet as to how the regulations promulgated a few days ago with respect to shipments to jobbers are to be carried out, but in general the idea is that unless interfered with by priorities in advance of B 4, shipments can be made in August equal to the monthly average in the first half of the year. As the wire mills have been carrying some stocks, they will have less difficulty in making August shipments on such short notice than will be the case with some other branches of the finished steel trade. Prices on wire products for third quarter are given on page 305.

Hoops and Bands.—Mills are finding no difficulty in filling priority certificates for hoops and bands, but operations are so limited by the supply of steel that it is difficult to distribute material clear through the preference list. We quote hoops and bands at 3.50c., Pittsburgh, subject to the new list of standard extras promulgated last May.

Cotton Ties.—The major portion of the cotton ties required for the season has now been rolled, the requirements being about the same as a year ago. Cotton ties for August delivery are \$1.94 per bundle of 45 lb.

Shafting.—There is nothing new in the market. Production is considerably restricted on account of shortage of steel, but there is enough tonnage to cover all essentials. We quote cold-rolled shafting at 17 per cent off list in carloads and 12 per cent in less than carloads f.o.b. Pittsburgh for third quarter.

Nuts and Bolts.—Supplies of nuts and bolts continue very scarce and there is heavy pressure upon producers for such material as they can turn out, there being very little available for purposes not recognized as more essential. Discounts on nuts and bolts for third quarter are given on page 305.

Tin Plate.—The tin plate mills continue their remarkable record of operating practically full during the summer, an altogether unprecedented performance. Last week about 98 per cent of all the mills were in operation and the tonnage outputs per mill were practically up to normal. The workers have been educated to the necessity of putting forth their best efforts. The mills expect to run full during the remainder of the year and nearly all their raw materials are taken care of. Supplies of palm oil will even run them into next year while pig tin requirements for very nearly the remainder of this year already are fully taken care of. We quote tin plate for third quarter at \$7.75 per base box f.o.b. Pittsburgh made from Bessemer or open-hearth stock, although scarcely any of the latter is available. Prices onterne plate for third quarter are given on page 305.

Rivets.—Demand for rivets for shipbuilding continues to increase and without an increase in production

supplies for the less essential industry are likely to decrease. We quote cone-head structural rivets at \$4.40 and cone-head boiler rivets at \$4.50 per 100 lb. Small rivets are 50 and 10 per cent off list f.o.b. Pittsburgh for third quarter.

Spikes.—Shipments of railroad spikes on old orders are still being made to a limited extent, but considerable tonnage is expected to be placed by the railroads in the near future. Small spikes are active and hard to secure, producers being well sold up. We quote:

Standard sizes of railroad spikes 9/16 x 4 1/2 in. and larger, \$3.90 per 100 lb. in lots of 200 kegs of 200 lb. each, or in larger lots. Boat spikes, \$5.25 per 100 lb., track bolts, \$4.90 base in lots of 200 kegs or more; less than 200 keg lots, \$1 per 100 lb. extra. All f.o.b. Pittsburgh.

Hot-Rolled Strip Steel.—Demand continues of moderate proportions but amply sufficient to absorb all the output available, as most of the mills are not running at more than about 60 per cent of capacity due to shortage of steel. We quote hot-rolled strip steel at \$3.50 per 100 lb. f.o.b. Pittsburgh with 50c. additional per 100 lb. for special stamping quality, f.o.b. Pittsburgh.

Cold-Rolled Strip Steel.—Commercial demand for cold-rolled strip steel continues of only moderate proportions and there has not been a great deal of Government business placed of late. Mills continue operation at between 60 and 70 per cent of capacity. We quote:

We quote cold-rolled strip steel at \$6.50 per 100 lb., f.o.b. Pittsburgh, terms 30 days, less 2 per cent for cash in 10 days when sold in quantities of 300 lb. or more. Freight is allowed to destination when it does not exceed 31c. per 100 lb.

Skelp.—There are no market offerings of skelp, the producers having regular contracts with customers that fully absorb all the skelp they can produce.

We quote grooved skelp at \$2.90; universal skelp, \$3.15, and sheared skelp, \$3.25 base. Special skelp for boiler tubes, etc., is \$3.40 for base sizes and \$3.55 for other sizes, all prices being per 100 lb., f.o.b. Pittsburgh.

Wrought Pipe.—The new regulations regarding shipments by pipe mills to jobbers are being digested and it is believed that approximately the distribution called for can be effected. With better supplies of pipe from mills, jobbers expect to be able to sort off their stocks which have become ragged at many points of late. Discounts on iron and steel pipe are given on page 305.

Boiler Tubes.—There is nothing new in the market, as the producers are all very much oversold on account of the heavy Government demand that has existed for more than a year. Discounts on iron and steel boiler tubes are given on page 305.

Coke.—Production of by-product coke continues to increase almost every week and there is in general a slight improvement in the production of Connellsville coke. The beehive operations in the Connellsville region have not been adversely affected by the larger drains made up on the region in the form of coal for new by-product ovens. Labor performance in the Connellsville region is reported as distinctly better due to the strenuous efforts started some time ago to educate the men to the necessity of working full time. More labor is being put at the screening of old dumps and the material resulting, while it does not look well, has found a ready sale for heating purposes as its fuel value is not impaired. For the best grade the usual asking price is \$6.50. Blast furnaces seem to be well supplied with coke, as there is practically no complaint. Offerings in the market are almost entirely of foundry coke and this finds a ready sale. It is believed that many foundries are stocking coke against next winter. Output of coke in the Connellsville and lower Connellsville region in the week ended July 20 was 351,650 tons, a decrease from the previous week of 1820 tons. We quote furnace coke at \$6; 72-hr. foundry coke at \$7 and crushed coke over 3/4-in. at \$7.30, these being Government prices and all in net tons at oven.

Old Material.—The quantity of scrap the dealers are able to offer grows less every week. The dealers are working hard to find scrap, but are meeting with very little success, production being so light. The Pennsylvania Railroad list is out and contains less scrap than

usual. Bids are to be in by Aug. 5 and awards will be mailed Aug. 9. Mills are buying direct all the scrap they can secure, but are still very short and are dissatisfied with the grades of scrap they must use. It is stated that a considerable increase in steel output could be effected if there were anything like a normal scrap supply. Dealers, as a rule, are securing their commission without difficulty when they have any material to offer.

Heavy steel melting scrap, Steubenville, Folsom, Brackenridge, Monessen, Midland and Pittsburgh, delivered	\$29.00
No. 1 cast scrap (for steel plants)	29.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., Franklin, Pa., and Pittsburgh	34.00
Hydraulic compressed steel scrap	29.00
Bundled sheet scrap, sides and ends, f.o.b. consumer's mills, Pittsburgh district	\$27.50 to 29.00
Bundled sheet stamping scrap	22.00 to 23.00
No. 1 busheling scrap	28.00 to 29.00
Railroad grate bars	18.00 to 19.00
Low phosphorus melting stock (unguaranteed)	34.00
Low phosphorus melting stock (guaranteed)	36.50
Low phosphorus melting stock (bloom and billet ends, heavy plates)	39.00
Iron car axles	46.00 to 46.50
Locomotive axles, steel	46.00 to 46.50
Steel car axles	46.00 to 46.50
No. 1 busheling scrap	28.00 to 29.00
Machine shop turnings	19.00
Cast iron wheels	29.00
Rolled steel wheels	36.00
Sheet bar crop ends (at origin)	35.00
Cast iron borings	19.00
No. 1 railroad wrought scrap	34.00
Heavy steel axle turnings	24.00
Heavy breakable cast scrap	28.00 to 29.00

The American Steel Co., Park Building, Pittsburgh, operating a tin mill plant at Waynesburg, Pa., and wire and wire nail mills at Ellwood City, Pa., has issued a financial statement as of July 2, 1918, as follows:

ASSETS	
-Accounts receivable	\$371,975.77
Bills receivable	1,560,000.00
Cash	465,512.05
United States Government bonds	325,000.00
Inventories	442,170.36
Quick assets	\$3,164,658.18
Plants	\$691,092.92
Plant improvements, etc.	15,212.17
Gas wells	16,073.32
Unexpired insurance	8,743.63
	731,122.04
	\$3,895,780.22
LIABILITIES	
Accounts payable	\$71,579.53
Bills payable	80,000.00
Quick liabilities	\$161,579.53
Common stock	\$1,500,000.00
Preferred stock	1,500,000.00
Surplus	76,770.10
Profit and loss, balance Jan. 1	158,147.60
First half 1918	499,282.99
	3,734,200.69
	\$3,895,780.22

M. B. Kelly, president, states that its fuel situation has been much improved, by leasing property and drilling for gas near Waynesburg, Pa. One gas well came in with a product of over 1,000,000 cu. ft. of natural gas per day, and another with a product of about 1,500,000 cu. ft. per day, and a third well is now being drilled.

Horace Mills, general manager of the Stroh Castings Co., Detroit, who spent 10 days in Washington seeking pig iron, says that he procured promise of only about one-quarter the tonnage desired, and then only on the cancellation of all orders held by the company from automobile manufacturing companies. This places this company on the 100 per cent war basis. The Gray Iron Castings Co. is also on that basis.

The Tacoma Coke & By-Products Co., Tacoma, has been incorporated for \$5,000,000 by E. E. Hedges, Lewis Marks and W. A. Johnson. Articles of incorporation give the company power to engage in mining, development of clay, iron and other mineral deposits, manufacture of clay and coke, etc.

Chicago

CHICAGO, July 29—(By Wire).

Government specifications have been somewhat heavier in the past week, the call for forging billets having been notable with the leading interest. For the Symington-Chicago Corporation's shell plants at Chicago orders requiring over 2200 tons of fabricated material have been placed. It is reported that the Government will place 10,000 small cars for France, each of which will take four or five tons of steel. As yet they have not been allocated. The production of standard rails has been increased. In a few cases the mills are taking orders not subject to priority, but it is made clear that delivery must be in the remote future, judging from the present outlook. A recent order from Washington will help the jobbers. Poor deliveries in recent months left them with but little to replace under the Government plan; so for August they are to be allowed the equivalent of the average monthly tonnage taken by them in the first half of the year. They are warned by Director Replogle, however, that from September on they can replace only what they have sold in the preceding month, according to the plan formulated. They are to pledge themselves to act in good faith. The scheme amounts to giving the jobbers a fresh start.

A Northern pig-iron interest is taking business for the first half of 1919 quite freely and a Southern producer announces that it will soon enter the market for the same period, both makers selling, of course, subject to all Government restrictions. A low phosphorus furnace has been requested not to sell into next year because of the shortage of that grade and the great need of it for munitions. Old material is strong.

Pig Iron.—The leading Northern producer has been making contracts with comparative freedom for delivery in the first half of 1919, subject, of course, to all governmental restrictions, and it is announced that in a short time the leading Southern producer of foundry will take business for delivery in the same period. In the case of the latter company it is stated that those who want iron must say specifically in their letters just what work they are doing and wherever possible give the Government order numbers. The consumers are informed that the principal call will be for high-silicon iron, inasmuch as most of the Northern furnaces are running on low-silicon grades, and it is questionable whether there will be enough high-silicon to go around. It is requested that wherever possible alternate grades be named in inquiries, so that the furnace may have some latitude in filling orders. The scarcity of low phosphorus iron is reflected in an official request to a Western producer to enter no contracts for 1918. A Northern maker of iron is reported to be sounding large consumers with a view of consummating contracts for iron over a period of five years on monthly settlements, the price for each month to be determined by the average prices paid in the preceding month. Current business is without interest, but inquiry for next year is steadily widening. Melters are in many cases seeking substitutes for cast iron, one maker of sewing machines using more wood than he has heretofore, presumably in the manufacture of cabinets.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable, and steel-making irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5.....	\$38.00
Lake Superior charcoal, No. 6 and Scotch	\$39.50 to 41.00
Northern coke foundry, No. 1.....	33.50
Northern coke foundry, No. 2.....	33.00
Northern coke foundry, No. 3.....	32.50
Northern high-phosphorus foundry.....	33.00
Southern coke, No. 1 foundry and No. 1 soft..	39.50
Southern coke, No. 2 foundry.....	38.00
Malleable	33.50
Basic	32.00
Low phosphorus (copper free).....	53.00
Silvery, 7 per cent.....	46.20

Ferroc alloys.—Quiet prevails. We quote 70 per cent ferromanganese at \$250 delivered; 50 per cent ferro-silicon at \$150 to \$160 delivered, and 16 to 18 per cent spiegeleisen at \$75 furnace.

Plates.—Government needs continue to absorb pro-

duction, as they will for months to come. Meanwhile other and less urgent demand is piling up.

The official mill quotation is 3.25c., Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers who have stock quote 4.52c.

Structural Material.—Lettings for fabricated work make a better showing in this territory than for some time past, but the entire district has to be raked for material. The Economy Scaffold Co., Wondnagel & Co., Decatur Bridge Co. and Pilsen Foundry & Iron Works will fabricate 1572 tons for the Symington-Chicago Corporation, Chicago. The Clinton Bridge Works will fabricate 624 tons for crane runways and shell cooling building for the same company. Not only mills but jobbers and Eastern interests have been called in to supply steel for this new shell plant. The American Bridge Co. will furnish 179 tons for the McDougall Duluth Co.'s machine shop at Duluth, Minn. The South Halsted Street Iron Works will fabricate 543 tons for a building and extension to the plant of the Crane Co., North Corwith, Chicago. The Hansell-Elcock Co. will furnish 159 tons for a powerhouse extension to the plant of the Greiss-Pfleger Tanning Co., Waukegan, Ill.

The official mill quotation is 3c., Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 4.27c. for material out of warehouse.

Cast Iron Pipe.—Madison, Wis., took b'ds July 26 on 120 tons and Argyle, Minn., on the same day took bids on about 300 tons, the awards not yet being reported. Cleveland's 2500 tons is still pending. In all cities the uncertainty attached to bond issues and their approval by the Government is a restraining factor in the pipe business. The Government has placed several pipe orders for Eastern delivery. We quote per net ton, Chicago, as follows:

Water pipe, 4-in., \$65.05; 6-in. and larger, \$62.05.

Wire Products.—No developments of any sort are reported. The expected official statement with regard to distribution has not materialized. For prices see finished iron and steel f.o.b. Pittsburgh, page 305.

Bars.—Except where consumers are entitled to priority, they have but little chance of getting steel bars, and even with Government sanction they must wait their turn. Occasionally a lot is squeezed through where the need is urgent. Bar iron mills continue to book orders at an improved rate, though they are under no great pressure. Rail carbon bars are dependent on rerolling rails, and few of these are being offered.

We quote, mill prices, mild steel bars at 2.90c., Pittsburgh, taking a freight rate to Chicago of 27c. per 100 lb. Bar iron is quoted at 3.50c., Chicago, and rail carbon at 3c. Chicago, a leading maker having adhered to Chicago as the basing point. Jobbers' prices follow:

Soft steel bars, 4.17c.; bar iron, 4.17c.; reinforcing bars, 4.17c., base. No extra charge for twisting $\frac{3}{4}$ -in. and over; $\frac{3}{4}$ c. for twisting $\frac{3}{4}$, 1 1/16, $\frac{1}{2}$ and 9/16; 5c. for 7/16 and $\frac{3}{4}$; 10c. for 5/16 and 15c. per $\frac{1}{4}$ -in. Extras as per card are charged for small sizes. Shafting, list plus 13 per cent.

Sheets.—The mills are operating around 65 per cent of capacity, but none of the active consumers appears to be suffering for want of material. Where priority exists deliveries can be made in about 60 days. For prices see finished iron and steel, Pittsburgh, page 305.

Chicago delivery out of stock, regardless of quantity. No. 10 blue annealed, 5.52c.; No. 28 black, 6.52c., and No. 28 galvanized, 7.77c.

Bolts and Nuts.—Less material is being received by the makers, with the result that operations are slowing down, although the demand for the finished product shows no diminution. For prices and freight rates see finished iron and steel f.o.b. Pittsburgh, page 305.

Structural rivets, 5.67c.; boiler rivets, 5.77c.; machine bolts up to $\frac{3}{4}$ x 4 in., 37 1/2 per cent off; larger sizes 25 and 5 off; carriage bolts up to $\frac{3}{4}$ x 6 in., 32 1/2 off; larger sizes, 20 off; box pressed nuts, square, tapped, \$1.05 off; hexagon tapped, 85c. per 100 lb.; coach or lag screws, gimlet points, square heads, 40 per cent off.

Rails and Track Supplies.—Rail production is now at an increased rate, which means a let-down in some other directions. The roads have plenty of orders filed; they want the rails. Inquiry for track fastenings is a little heavier. Light rails are active. We quote:

Standard railroad spikes, 4.11 1/2c., Chicago. Track bolts, with square nuts, 5.11 1/2c., Chicago. Tie plates, steel, 3.23c.; tie plates, iron, 3.75c.; f.o.b. maker's mill. The base for light rails is 3c., f.o.b. maker's mill for 25 to 45-lb. sections, lighter sections taking Government extras.

Old Material.—The demand for melting steel is strong and the market generally is well sustained. Considerable steel continues to go to points East. Cast is in good demand, one inquiry for 5000 tons coming from Beloit, Wis. Meanwhile material is no more plentiful than it was. The car wheel market has practically ceased to exist, as none are coming out and the rerolling rail situation is such as to seriously impede the operations of the mills rolling high carbon steel. Small lists have been issued by the Chicago & Alton, Chicago & Western Indiana, Pennsylvania lines and the Northwestern.

We quote for delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails.....	\$39.00
Rerolling rails.....	\$55.00 to 60.00
Old carwheels.....	29.00
Old steel rails, rerolling.....	34.00
Old steel rails, less than 5 ft.....	34.00
Heavy melting steel.....	29.00
Frogs, switches and guards, cut apart.....	29.00
Shoveling steel.....	29.00
Steel axle turnings.....	24.00

Per Net Ton

Iron angles and splice bars.....	\$34.82
Iron arch bars and transoms.....	41.50
Steel angle bars.....	30.36
Iron car axles.....	41.52
Steel car axles.....	41.52
No. 1 railroad wrought.....	\$29.75 to 30.36
No. 2 railroad wrought.....	27.75 to 28.25
Cut forge.....	28.25 to 28.75
Pipes and flues.....	24.50 to 25.00
No. 1 busheling.....	26.50 to 27.00
No. 2 busheling.....	18.50 to 19.00
Steel knuckles and couplers.....	30.36
Coil springs.....	30.36
No. 1 cast scrap.....	28.25 to 28.75
Boiler punchings.....	32.00 to 33.00
Locomotive tires, smooth.....	40.50 to 41.52
Machine-shop turnings.....	15.75 to 16.25
Cast borings.....	16.50 to 16.94
Stove plate and light cast scrap.....	23.50 to 24.00
Grate bars.....	23.75 to 24.25
Brake shoes.....	24.25 to 24.75
Railroad malleable.....	30.36
Agricultural malleable.....	29.00 to 30.00
Country mixed scrap.....	21.00 to 21.50

Birmingham

BIRMINGHAM, ALA., July. 30.

Pig Iron.—The Alabama Co. will this week begin the making of 10,000 tons of basic for the English allies. The present specification for the Sloss-Sheffield and the Woodward companies is for 10,000 each under new allocations. Additional allocations are expected later. A fourth company is being considered in this connection, but it is doubted whether it can produce the pig iron. Federal experts are here to inspect the output prior to shipment. Allocations of foundry iron come with regularity. One order was for 750 tons for the Emergency Fleet Corporation on the Pacific Coast. Many consumers of this allocated metal are new to the South, but the Southern furnace interests are doing their utmost to follow Government instructions in spirit and letter. For the present at least there appears to be practically no pig iron for the non-essential industries. For instance, one employing convict labor has been regretfully declined delivery by the company which has supplied it for years. The War Industries Board appears to be trying to accommodate all as far as possible, it frequently occurring that a consumer refused metal on the showing of his essential questionnaire soon afterward secures consent from the board. Furnace practice has not improved even with the increased coal supply owing to green hands and still remaining raw material drawbacks. The brisk inquiry for pig iron for 1919 has not eventuated in the placing of much business. In fact, it is not known whether any has been actually booked except in a tentative way. There has been no recent addition to active stacks owing to unexpected delays from one cause and another. We quote per gross ton f.o.b. Birmingham district furnaces as follows:

No. 2 foundry and soft.....	\$33.00
Basic.....	32.00

Cast Iron Pipe.—There is prospect of considerable new business on the part of sanitary pipe shops and some water pipe business owing to the \$500,000 allotted

for Government houses for employees at Muscle Shoals and other allotments expected in the near future. Government works continue to take a fair amount of water pipe.

Coal and Coke.—The coal output has increased incident to the personal appeal of returned soldiers and others, the record for the week ending July 20 being 415,000 tons, compared with 379,000 tons a few weeks previous and at the rate of over 21,600,000 tons per annum, compared with Alabama's high record of 20,412,000 in 1917. Coke supply has not increased in proportion, but has improved.

Old Material.—Scrap dealers report an increase in the price for scrap demanded by the country trade and a consequent cutting down of their profits under present price basis, but they have been unable to raise quotations. The consumption is increasing, owing to the use of additional scrap in foundries. Some betterment in price is probable under the increased demand. We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Old steel axles.....	\$35.00 to \$36.00
Old steel rails.....	28.00 to 28.50
Heavy melting steel.....	25.00 to 26.00
No. 1 railroad wrought.....	30.00 to 32.00
No. 1 cast.....	27.50 to 28.50
Old carwheels.....	29.00 to 29.50
Tramcar wheels.....	26.00 to 26.50
Machine shop turnings.....	15.00 to 16.00
Cast iron borings.....	15.00 to 16.00
Stove plate.....	23.00 to 23.50

St. Louis

ST. LOUIS, July 29.

Pig Iron.—Although the demand for pig iron continues as heavy as ever, there is very little, if any, relief apparent in the situation and plants operating for domestic purposes are still heavily handicapped by the lack of material with which to work. There is increasing evidence of new Government business in the district, however, and wherever this appears there is improvement in deliveries of pig iron and in the maintenance of the working forces which in some cases were threatened with serious disintegration because of the inability of plants to operate. During the past week, a number of sales of Northern pig iron for delivery in the first half of 1919 were made, apparently agreeably to Government wishes, but the aggregate was not especially heavy, although there is expectation that other sales will follow if the material is to be used in Government work, directly or indirectly. The heavy needs for foundry iron and basic previously reported continue, but there is no immediate prospect, without Government help, of their being filled.

Coke.—The week in coke has been enlivened by a number of renewals of contracts with old customers by the ovens for first half of 1919 and in some cases for the whole year—this in order to protect them against the future. No new business has been entered into by any of the oven representatives, as no supplies are available and, more than that, an advance in prices by the Government seems to be expected shortly. Both by-product and bee-hive coke, domestic as well as metallurgical, are completely sold up so far as any nearby or future deliveries to others than old customers are concerned.

Finished Iron and Steel.—The needs for finished products are being carefully censored by the warehouses, while the mills are taking on no new business of any character and are doing the best they can to help old customers on their contracts which existed before the Government pressure for material became so severe. The warehouses report the demand for iron and steel very heavy, with a goodly proportion turned down by the "board of censors" which scrutinizes all requests for material very carefully. Receipts by warehouses of shipments from mills are very short and also slow in coming in. For stock out of warehouse, we quote as follows: Soft steel bars, 4.24c.; iron bars, 4.24c.; structural material, 4.34c.; tank plates, 4.59c.; No. 8 sheets, 5.54c.; No. 10 blue annealed sheets, 5.59c.; No. 28 black sheets cold rolled, one pass, 6.59c.; No. 23 galvanized sheets, black sheet gauge, 7.84c.

Old Material.—In the scrap market, there has been during the week just passed an exceptionally heavy demand for material, but the supply has been extremely small, with the result that there is a piling up of needs that may have a serious bearing on the output of local plants in the near future, particularly in the light of the scarcity of pig iron. All classes of consumers are included in the present situation as to the call for scrap. The railroads are offering very little, as they have practically no opportunity to pick up such as may be available along their lines, nor cars to transport it. Sales, such as are made, are largely at Government prices, with a growing tendency to pay the dealers the permitted commissions. The situation as to the switching charges on scrap crossing the river and within the St. Louis industrial district has shown no change, the appeal of the dealers being up to the Government management of the railroads for decision. In the meantime on such shipments as are made, the dealers and others are paying the new rates under protest with a view to making claims if they succeed in winning a reversal of the Terminal authorities' action. No future contracts are being entered into and because of the existence of Government prices, for the most part, there are no changes of moment to be reported in the list of materials. We quote dealers' prices, f.o.b. customers' industrial works. St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails.....	\$37.00 to \$37.50
Old steel rails, rerolling	33.50 to 34.00
Old steel rails, less than 3 ft.....	31.00 to 31.50
Relaying rails, standard sections, subject to inspection.....	55.00 to 65.00
Old carwheels.....	28.50 to 29.00
No. 1 railroad heavy melting steel scrap	28.50 to 29.00
Heavy shoveling steel.....	27.00 to 27.50
Ordinary shoveling steel.....	26.50 to 27.00
Frogs, switches and guards, cut apart.....	28.50 to 29.00
Ordinary bundled sheet scrap.....	23.00 to 23.50
Heavy axle and tire turnings.....	20.50 to 21.00

Per Net Ton	
Iron angle bars	\$33.00 to \$33.50
Steel angle bars.....	27.00 to 27.50
Iron car axles.....	40.00 to 40.50
Steel car axles.....	40.00 to 40.50
Wrought arch bars and transoms.....	40.00 to 40.50
No. 1 railroad wrought.....	28.50 to 29.00
No. 2 railroad wrought.....	27.50 to 28.00
Railroad springs.....	29.50 to 30.00
Steel couplers and knuckles	29.50 to 30.00
Locomotive tires, 42 in. and over, smooth inside	37.00 to 37.50
No. 1 dealers' forge.....	26.00 to 26.50
Cast iron borings	16.25 to 16.75
No. 1 busheling	25.50 to 26.00
No. 1 boilers, cut to sheets and rings.....	22.50 to 23.00
No. 1 railroad cast scrap.....	25.50 to 26.00
Stove plate and light cast scrap.....	21.50 to 22.00
Stove plate and light cast scrap.....	21.50 to 22.00
Railroad malleable	26.00 to 26.50
Agricultural malleable	25.00 to 25.50
Pipes and flues.....	23.00 to 23.50
Heavy railroad sheet and tank scrap.....	22.50 to 23.00
Railroad grate bars.....	20.00 to 20.50
Machine shop trimmings.....	16.00 to 16.50
Country mixed scrap.....	19.50 to 20.00
Uncut railroad mixed scrap.....	23.50 to 24.00

San Francisco

SAN FRANCISCO, July 23.

Working out a wage scale satisfactory to both employers and employees was undertaken at a meeting held today in Seattle by a committee appointed by Charles A. Piez of the Emergency Fleet Corporation previous to his departure for the East. This committee is composed of George Armes, San Francisco, president of the Moore Shipbuilding Co., Oakland; J. F. Duthie, president of J. F. Duthie & Co., Seattle; David Rogers, general manager for Skinner & Eddy Corporation, Seattle, and H. J. Anderson, expert accountant, San Francisco. The findings and recommendations of the committee are to be used at a meeting to be held in Philadelphia, Aug. 5, of officials of the Emergency Fleet Corporation, members of the wage adjustment board and representatives of the shipbuilders and union labor. It is expected that at the latter meeting all the labor troubles of the Pacific Coast will be adjusted, both the demands made for an increase on

either side of the bay on account of the alleged advance in the cost of living since the first of the year, and the boilermakers' controversy which tied up shipbuilding in Oakland recently for 48 hours. In the latter case, the men returned to work on the promise of a consideration of their cause by the Government.

The market conditions of iron and steel products on the Coast are unchanged except for the constantly closer drawing of the lines by the Government. The jobbers have been informed that the Government has no intention of neglecting their needs, and will maintain reasonable stocks with the jobbers, so that the Government, the war industries and civilian essential requirements may be met as promptly as possible. The jobbers are required to make monthly reports of the disposition of their stock, and they are now watching this feature more carefully than before. The jobbers have informed their customers of the basis on which they can obtain deliveries, and the trade is generally hopeful that the strict adherence to these instructions will allow them to carry larger stocks than they have been able to get for some time past.

Structural Materials.—Outside of war work, no structurals are coming into this district. Some small structural materials were received by the jobbers on priority orders before the last order regarding jobbers was issued, but the stock is now almost exhausted.

Sheets.—There is still some galvanized sheets in the hands of the jobbers, but the stocks are so broken that it is almost impossible to fill any order and absolutely impossible to furnish delivery on an order for any considerable amount.

Wrought Pipe.—The shipbuilding companies have been making some local inquiry regarding tubular goods, but the local stocks are too small to supply them with any amount. The jobbers are watching the disposition made by the buyers of these goods, and are able to state that the goods are being used for the purposes for which they were sold. The Western Pipe & Steel Co., Los Angeles, have been awarded a contract at approximately \$20,000 for furnishing 12,000 feet of 16-in.; 4500 ft. of 15-in. and 1500 ft. of 8-in. riveted steel pipe for new water mains to be placed in the city of Monrovia, Cal.

Cast Iron Pipe.—There is very little buying of cast iron pipe for commercial purposes. The Government is taking more or less for military purposes, but otherwise there is no movement. The freight rate on Far Eastern exports went up from \$9 to \$17 for pipe recently, but the change in rates cannot be said to have any effect on the business as it is almost impossible to get export permits for cast iron pipe.

Pig Iron.—The pig iron market on the Coast remains unchanged. A little pig is still coming in from the East, but it is all arriving under old contracts, which were made at a much higher figure than the present price, and for use in strictly Government work.

Old Materials.—Emory Smith appears to have the scrap situation well in hand, as far as enforcing the price is concerned. However, not much is coming into this market, and new sources of supply will be necessary to prevent a real shortage. Some of the users of scrap are going far afield for material, but there are no reports of the discovery of large supplies. Mr. Smith is at present in Seattle, where it is understood he will impress upon the scrap dealers there the necessity of adhering to the Government prices.

B. Floersheim & Co., Pittsburgh, have been awarded all the high-pressure piping for the new boiler house and power plant and other auxiliary apparatus of the McKeesport Tin Plate Co., located at McKeesport, Pa. This company has also closed high-pressure piping installation for the Weirton Steel Co., Weirton, W. Va., which will include all the piping necessary for the blast furnace, boiler house, power house and by-product coke ovens. The company has just completed the large piping contract which it received from the Carnegie Steel Co. at the Duquesne steel works and furnaces, Duquesne, Pa., and also its contract with the American Sheet & Tin Plate Co. at Farrell, Pa.

British Steel Market

Domestic Pig Iron Prices Not Yet Adjusted— Ferromanganese Higher

(By Cable.)

LONDON, ENGLAND, July 31.

The pig-iron position is unsettled pending an adjustment of home prices. There is a large demand for hematite iron. American semi-finished steel is unobtainable. The tin plate market is strong at 33s 7½d basis. Ferromanganese is dearer at \$260 to \$270 c.i.f. We quote as follows:

Tin plate, coke, 14 x 20; 112 sheets, 105 lb., f.o.b. Wales, 35s 7½d.
Ferromanganese, \$260 to \$270, c.i.f. for export to America; 126 10s. for British consumption.
Ferrosilicon, 50 per cent, c.i.f., £35 upward.
On other products control prices per gross ton are:
Hematite pig iron, East Coast, £6 2s. 6d.; West Coast, £6 7s. 6d.
Cleveland pig iron (export), £5 5s. for No. 1 and £6 6s. for basic.
Steel plates, ship, bridge and tank, £11 10s. to £17, according to size.
S. M. boiler plates, basis, £12 10s.
Bar iron, standard quality, basis £13 17s. 6d.; marked, £16.
Sheet and tin plate bars, £10 7s. 6d.
Blooms and billets for rerolling (ordinary), £10 7s. 6d.; special quality, £11.
Wire rods, £21 10s. net, basis.

Buffalo

BUFFALO, July 29.

Pig Iron.—The increasing enlargement of the program for the consumption of iron for Government uses, to the extent that it may exceed the total of furnace production, is causing growing apprehension on the part of foundrymen not engaged on Government work, as to whether they will be able to secure any iron for future needs, and such melters are endeavoring to get into line on essential war needs contracts. Foundries and steel works are being forced to turn in a larger way to the substitution of scrap materials to make up for the shortage in the supply of pig. In most instances, producers are not now so much inclined to book 1919 business as they have been for the past two or three weeks, but rather to rely upon government allocations to furnish the market for their product for forward delivery periods, and await developments after old orders now on books and present allocations are cared for. In some instances, of course, furnacemen are willing to give consideration to the requests of old customers who may feel more secure to have an anchor to the windward in the way of having some 1919 orders entered on furnace books, even though engaged on classified essential work and expect to be protected by Government allocations. Consequently sellers are endeavoring to satisfy regular customers in this way to a reasonable extent. Considerable tonnages of basic iron as well as foundry grades have been allocated locally during the past week. Full capacity production is now coming out regularly from all the furnaces of the district. The fixed schedule of prices is continued as follows, f.o.b. furnace Buffalo:

No. 1 foundry, 2.75 to 3.25 silicon.....	\$34.50
No. 2 X, 2.25 to 2.75 silicon.....	33.50
No. 3 foundry, 1.75 to 2.25 silicon.....	32.50
Gray forge	32.00
Malleable	33.50
Basic	32.00
Lake Superior charcoal, regular grades, f.o.b. Buffalo	37.50

Finished Iron and Steel.—Selling agencies report that more clearly defined instructions have been received this week from the Director of Steel Supplies as to the amount of replacement tonnage that can be applied for by steel distributors. All regular customers of mills and agencies are readily complying with the pledge requirements, guaranteeing that the steel for which they are seeking to place orders will be used for essentials and that they will show actual use to which steel is applied. Distributors are keeping records which will enable them to make monthly reports to mills, showing where the previous month's tonnage has been sold and the purposes for which

it is to be used. Pipe jobbers are also in line in the same way, to show records of monthly distribution. Bar iron shows increased activity for the week and some tonnages have been reported closed. Bids are to be taken the coming month for the 1500 tons of structural steel required for the 8-story hospital building to be erected by the Mercy Hospital, Abbott Road and Cazenovia Park, Buffalo, the total cost of the structure being estimated at \$800,000.

Old Material.—Dealers report there is a steady market for all classes of material at top prices; but that they are seriously handicapped by a shortage of labor in accumulation, classification and loading of materials at yards in sufficient tonnages to fill the demand and this has a tendency to check business. The buying movement is also retarded by insufficient help at consumers' mills and foundries to handle scrap when it comes into them. Some dealers have been obliged to refuse tonnages of scrap offered them this week due to the lack of labor. In consequence of this situation, there has been some falling off in the volume of business transacted during the week. The demand for cast scrap and also for heavy melting steel continues to be of large proportions and the inquiry for shell turnings is also good. There has been some indication recently, however, of a softening in the market for shell ends. Prices are firmly held. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$29.00
No. 1 low phosphorus, heavy, 0.04 and under.....	39.00
Low phosphorus, 0.04 and under.....	36.50
Low phosphorus, not guaranteed.....	34.00
No. 1 railroad wrought.....	34.00
No. 1 railroad and machinery cast.....	34.00
Iron axles	\$44.00 to 46.00
Steel axles	44.00 to 46.00
Carwheels	29.00
Railroad malleable	34.00
Machine shop turnings.....	17.00 to 17.50
Heavy axle turnings.....	24.00
Clean cast borings.....	18.00 to 19.00
Iron rails	36.00 to 37.00
Locomotive grate bars.....	24.50 to 25.00
Stove plate	24.50 to 25.00
Wrought pipe	27.00 to 28.00
No. 1 busheling scrap.....	29.00 to 30.00
No. 2 busheling scrap.....	21.00 to 23.00
Bundled sheet stamping scrap.....	21.00 to 23.00

Philadelphia

PHILADELPHIA, July 30.

The increasing volumes of steel put on the list for the United States and allied governments is fortifying a number of the trade who still persist that the various Government agencies as well as general customers have overestimated their needs. This is regarded as done purposely by all concerned, following history in this respect, that in a tight market all get unduly concerned about covering their own needs. It is understood, for example, that the shell steel required for the present half year will total 3,000,000 tons, requiring a continuous output probably 15 per cent above that of the last month. Similarly it is understood that total plate requirements are nearly 3,500,000 tons for the half year, an amount requiring a rate of shipping perhaps 12 per cent greater than obtaining recently. The result is that with the seven priority ratings in the A class and at least four in the B class, the shipment of material under the preferential list coming after the priorities is for the present substantially a dead letter.

Pig Iron.—So much iron has been allocated to the furnaces that there is practically none for sale of any kind for delivery in 1918, even if the producers were willing to entertain such proposals. There are instances where consumers have succeeded in effecting contract protection, at least in foundry iron, to such an extent that the melter either has very large orders or is playing for the future. Urgent requests on such consumers for a modification have met no response. On the other hand, it is still maintained that many foundries are in need of iron and that it is not unlikely that orders will issue for foundries to use half iron and half scrap in their burdens. We continue to

quote standard grades of iron f.o.b. furnace, except Virginia iron, for which the delivered prices are quoted:

Eastern Pennsylvania No. 1 X.....	\$34.50
Eastern Pennsylvania No. 2 X.....	33.50
Eastern Pennsylvania No. 2 foundry.....	33.00
Virginia No. 2 X (including freight).....	37.60
Virginia No. 2 foundry (including freight).....	37.10
Basic	32.00
Gray forge	32.00
Bessemer	35.20
Standard low phosphorus	53.00
Low phosphorus (copper bearing).....	50.00

Ferroalloys.—A quiet market continues in ferroalloys and spiegeleisen. We quote prices as follows: 70 per cent ferromanganese f.o.b. furnace, with freight allowed, \$250, and 16 to 18 per cent alloy, \$75.

Coke.—We quote 48-hr. furnace coke at \$6 and 72-hr. foundry coke at \$7, Connellsville.

Billets.—Washington is having difficulty in placing some 12,500 tons of 4 x 4-in. material for making rivets. At this writing one-half has been accepted. There is a demand for shell discard steel billets for the re-rolling mills, but at least one producer is considering the possibility of being required to remelt this steel to make up for the shortage of general melting scrap. We quote open-hearth re-rolling billets at \$51.30, Philadelphia.

Finished Iron and Steel.—Distribution of Government orders continues to dislodge the consideration of any general commercial business. Even the bar iron mills are well filled and also universal plate mills. There are signs that the reins will be drawn tighter on the distribution of shell discard steel in spite of the fact that much of it is rolled into concrete bars, going into Government buildings. An allocation of 88,000 tons of shell steel for France and Great Britain is at the moment being made, but with difficulty owing to the delivery required. We quote plates, 3.48c.; plain structural material, 3.23c.; steel bars, 3.13c.; No. 10 blue annealed sheets, 4.48c.; No. 28 black sheets, 5.23c.; No. 28 galvanized sheets, 6.48c. and bar iron, 3.73c., all Philadelphia.

Old Material.—Some business has been done in grate bars and stove plate at \$1 above last week's quotations, and in fact for stove plate as high as \$28 has been quoted. The shortage of scrap is becoming so acute that one large maker of shell steel is planning to remelt the discard portions. Where shell steel makers have been rolling bars there has been a market for discard steel in the shape of shells for testing powder. Whether the surplus will hereafter be remelted in the open-hearth furnaces instead of being put into light rails or concrete bars is not as yet ascertained. We quote for delivery at buyers' yards, eastern Pennsylvania, as follows:

No. 1 heavy melting steel.....	\$29.00
Steel rails, re-rolling.....	34.00
No. 1 low phosphorus heavy, 0.04 and under.....	39.00
Low phosphorus, 0.04 and under.....	36.50
Low phosphorus, 0.06 and under.....	\$32.00 to 34.00
Old iron rails.....	39.00
Old carwheels.....	29.00
No. 1 railroad wrought.....	34.00
No. 1 yard wrought.....	33.00
Country yard wrought.....	29.00
No. 1 forge fire.....	28.00 to 29.00
Bundled skeleton.....	28.00 to 29.00
No. 1 busheling.....	31.00
No. 2 busheling.....	17.00 to 18.00
Turnings (for blast furnace use).....	18.00 to 19.00
Machine shop turnings (for rolling mill use).....	18.50 to 19.00
Cast borings (for blast furnace use).....	18.00 to 19.00
Cast borings (clean).....	19.00
No. 1 cast (for steel plant use).....	29.00
No. 1 cast (cupola sizes).....	33.00 to 34.00
Grate bars.....	26.00 to 27.00
Stove plate.....	26.00 to 27.00
Railroad malleable (for steel plants).....	26.00 to 27.00
Railroad malleable (for malleable works).....	31.00 to 32.00
Wrought iron and soft steel pipes and tubes (new specifications).....	33.00
Ungraded pipe.....	29.00

The American Multigraph Co., Cleveland, which is largely engaged on munition work, has almost entirely substituted women for men employees for inspection and light machine work and is at present employing over 900 women.

New York

NEW YORK, July 31.

Pig Iron.—Some sales of charcoal iron have been made for delivery during the first half of next year, but no other selling for that delivery has been announced and the prevailing sentiment of sellers seems to be against making further sales for that delivery. Considerable inquiry continues to come in, as buyers feel that they would like to know how their requirements are to be provided for, but it does not seem likely that the present policy of the furnaces will be reversed. We quote prices as follows for tidewater delivery on Northern and Southern grades:

No. 1 X.....	\$35.40
No. 2 X.....	34.00
No. 2 plain.....	33.90
No. 2 X Virginia.....	37.90
No. 1 Southern (all rail).....	42.20
No. 2 Southern (all rail).....	40.70

Ferroalloys.—The appeal of the Sub-Committee on Ferroalloys that consumers cover their requirements for ferromanganese as far ahead as possible, instead of buying from hand to mouth has so far found no reflection in the market. Inquiries for any delivery are very few, the largest being for 250 tons for this year. Sales are insignificant and confined to small lots at \$250, delivered, for 70 per cent alloy, plus \$4 per unit above this standard, which is the firm quotation. The spiegeleisen market is very quiet with the quotation unchanged at \$75, furnace, for 16 per cent alloy plus \$3.50 per additional unit. The market for ferrosilicon, 50 per cent, is quiet but strong with consumers well provided for. For contract the quotation is about \$150 per ton, delivered, with as high as \$170 to \$175 asked for spot. Demand is so small that quotations are largely nominal. Several producers are practically sold up for the rest of the year. Ferrotungsten is now quoted at \$2.40 per lb. of contained tungsten, New York, with the ore concentrates selling at between \$20 to \$24.50 per unit in 60 per cent material. We quote ferrovanadium at \$4 to \$5, Pittsburgh, per lb. of contained vanadium for prompt delivery in small lots, but very little is available, large quantities going into steel on Government orders. Ferro-carbon-titanium, 15 to 18 per cent, is selling at \$200 per net ton in carload lots, at \$220 per ton in lots between one ton and a carload, and at \$250 per ton in lots less than a ton, f.o.b. Suspension Bridge, N. Y.

Finished Iron and Steel.—The largest new structural steel proposition is for 6200 tons at the Mare Island Navy Yard. It is understood that about 2000 tons will be before the market shortly for a Government plant at Charlestown, W. Va. A marine railroad for the Government at San Diego, Cal., will take 400 tons. The Boston & Albany has asked for bids on 500 tons of work. The belief still persists that there is some over-buying, induced in part by salesmen, whom distributors, for example, have kept on the road. Consumers have thus ordered beyond immediate needs as a matter of protection, and this movement, it is claimed, has made its impress on the reported needs for indirect war purposes. It is admitted that general consumption of manufactures is large and should be larger, owing to the high wages which are being paid, and the lack of reports of shutdowns of steel users is taken to indicate how large have been the reserve supplies of material. It is reported that a change in chemical make-up of shell steel is pending so that any temporary delay in mill operations on this score may serve to expedite rail rolling. Another shift is noted in the jobbers' supply market. The Director of Steel Supply under date of July 24 points out that due to the curtailment of shipments over the last 60 days the stocks in jobbers' hands in some sections in certain lines have been entirely exhausted and it has therefore been impossible to secure replacement on the basis of July sales, accordingly mills are authorized to accept from jobbers for August an amount equal to the monthly average shipments to the jobbers over the first half of 1918. Replacement commencing September is to proceed strictly according to the July 3 circular. We quote mill shipments as follows: Steel bars, 3.145c.; shapes, 3.245c.; plates, 3.495c., and bar

iron, 3.745c., all New York. Out-of-store prices are 1c. higher.

Cast-Iron Pipe.—The various housing projects which are being undertaken by the Government are expected to require large tonnages of cast-iron pipe and some orders have been placed. It is not expected, however, that the buying by municipalities will be large except when rendered necessary by the building of houses for workmen engaged on war contracts. Government prices, including the new freight rates, are as follows: \$61.75, New York, for 6-in. and heavier; and \$64.75 for 4-in.; \$71.75 for 3-in., with \$1 additional for class A and gas pipe.

Old Material.—Owing to the fact that new construction is being rigidly restricted, there is very little razing of old buildings and less scrap than usual is being produced. The scarcity of labor is also having a tendency to limit the production of scrap. Yards are now paying from \$30 to \$34 per week for common labor as compared with \$12 to \$18 per week a year ago. The demand for all grades except low phosphorus is very active and shipments are going forward satisfactorily. We quote prices of brokers to New York producers and dealers per gross ton, New York, as follows:

Heavy melting steel.....	\$26.20
Re-rolling rails.....	30.80
Relaying rails.....	\$60.00 to 70.00
Iron and steel car axles.....	43.70
No. 1 railroad wrought.....	30.80
No. 1 railroad wrought, cut to not less than 10 in. or over 24 in.....	35.80
Wrought-iron track scrap.....	28.80
Forge fire.....	23.50 to 24.00
No. 1 yard wrought long.....	28.80
Light iron.....	10.00 to 11.00
Cast borings (clean).....	15.30 to 15.80
Machine shop turnings.....	15.30 to 15.80
Mixed borings and turnings.....	15.05 to 15.35
Iron and steel pipe (1 in. minimum diameter), not under 2 ft. long.....	29.30 to 30.80
Stove plate.....	23.50 to 24.00
Locomotive grate bars.....	23.50 to 24.00
Malleable cast (railroad).....	30.30 to 30.80
Old carwheels.....	25.80

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, are:

No. 1 machinery cast.....	\$34.00
No. 1 heavy cast (columns, building materials, etc.), cupola size.....	34.00
No. 1 heavy cast, not cupola size.....	29.00
No. 1 cast (radiators, cast boilers, etc.).....	\$27.00 to 28.00

Cleveland

CLEVELAND, July 30.—(By wire.)

Iron Ore.—A strike of the seamen on the Great Lakes, ordered for Monday, threatened to tie up ore traffic, but it was averted at a conference held in Washington Sunday attended by Chairman Hurley and other representatives of the United States Shipping Board and by officers of the various unions represented in the Lake shipping industry. A training system for new sailors for the merchant marine will be established on Lake boats, the welfare registry system will be abolished pending further negotiations, and the wage demands of the unions will be taken up at a conference in Washington Wednesday and adjusted. Telegrams were sent to President Livingstone of the Lake Carriers' Association, directing action regarding the training of men for the merchant marine, also discontinuing the registry system. The threatened strike interfered little with the ore movement, although some freighters were held up a few hours. Shipments at Superior are being delayed by a strike on the Great Northern ore dock. However, the July movement will probably exceed 10,000,000 tons and it is planned to move 30,000,000 tons during July, August and September, bringing Lake shipments up to 49,000,000 tons by Oct. 1. We quote f.o.b. lower Lake docks:

Old range Bessemer, \$6.40; old range non-Bessemer, \$5.65; Mesaba Bessemer, \$6.15; Mesaba non-Bessemer, \$5.50.

Pig Iron.—The buying of pig iron for the first half of 1919 continues at a fairly rapid rate, although some producers have not yet opened their books for that delivery. Sales are largely in malleable and foundry grades, although some steel-making iron has been contracted for. Sellers are covering those of their

regular trade who are now engaged in war essential work and are not guaranteeing deliveries, these being subject to the demands of the Government, which must be given preference. Foundries generally are anxious to cover for their first half of 1919 requirements and inquiry for that delivery is still coming out in very heavy volume. Consumers of steel-making iron are so far not showing a great deal of interest in their requirements that far ahead, as they doubtless feel that as they are supplying steel for Government needs, the Government will look after their supply of pig iron. One Cleveland selling agency has already sold practically all of its malleable and foundry iron for the first half. The demands upon the Government for all grades of pig iron for war essential work which are being referred to the Committee on Pig Iron, Iron Ore and Lake Transportation for allocation continue very heavy. A round tonnage was allocated during the week and many new inquiries developed. The committee is now working on 85,000 tons that remain to be allocated of the 180,000 ton lot for England and expects to distribute this within the next few days between both Northern and Southern producers. A new Government inquiry is for 14,000 tons of basic wanted by a central Ohio consumer. The clause in pig iron contracts covering the price in case Government restrictions are removed is being given considerable attention. Some sellers provide in their contracts that should Government regulations cease before the expiration of the contracts, the present Government maximum shall be paid. Should the Government lower the price and later remove price restrictions, the price the customer pays after the removal of the restrictions would, under these contracts, be the present Government maximum price instead of the last Government price. One seller declined to book an order leaving the question of price subject to mutual agreement should Government price restrictions be removed before the expiration of the contract. We quote delivered Cleveland, as follows:

Bessemer.....	\$36.60
Basic.....	33.40
Northern No. 2 foundry.....	33.40
Southern No. 2 foundry.....	38.00
Gray forge.....	32.40
Ohio silvery, 8 per cent silicon.....	47.90
Standard low phosphorus, Valley furnace.....	53.00

Old Material.—Scrap continues in good demand and the supply of some grades besides heavy melting steel and low phosphorus melting scrap is getting scarce. This is particularly true of borings. These, as well as turnings, are in good local demand. Cast scrap and stove plate are also getting rather scarce. The demand for the latter is active. Prices on grades that have been below the Government maximum have stiffened up close to that maximum. Sales of cupola cast scrap are reported at \$29 net. A sale of agricultural malleable is reported at \$32.50 gross for Chicago delivery. We quote delivered consumers' yards in Cleveland and vicinity as follows:

Per Gross Ton	
Steel rails.....	\$28.00 to \$29.00
Steel rails, re-rolling.....	34.00
Steel rails, under 3 ft.....	34.00
Iron rails.....	39.00
Iron car axles.....	46.50
Steel car axles.....	46.50
Heavy melting steel.....	29.00
Cast borings.....	18.50 to 19.00
Iron and steel turnings and drillings.....	18.25 to 18.75
No. 1 railroad wrought.....	34.00
Hydraulic compressed sheet scrap.....	28.00 to 29.00
Cast-iron car wheels, unbroken.....	29.00
Cast-iron car wheels, broken.....	34.00
Agricultural malleable.....	29.00 to 30.00
Railroad malleable.....	24.00
Steel axle turnings.....	24.00
Light bundled sheet scrap.....	24.50 to 25.00
Cast-iron scrap.....	29.00
Cast-iron scrap, broken to cupola size.....	32.00 to 33.00
No. 1 busheling.....	29.00 to 30.00

Per Net Ton	
Railroad grate bars.....	23.00 to 24.00
Stove plate.....	22.50 to 23.00

Coke.—Producers generally in the Connellsville district are now covering their foundry trade with contracts for the first half of 1919. It is expected that the majority of foundries will soon be under contract. The Coke Administrator in Washington has shut off

deliveries of Ashland coke to some consumers in this territory and these must find other sources of supply.

Bolts, Nuts and Rivets.—Specifications on bolt and nut orders are very heavy and manufacturers are from four to six months behind on deliveries. Considerable business is still being taken in contracts for the third and fourth quarter delivery. These include contracts from jobbers, but they will have to wait for some time before securing deliveries, as manufacturers will make shipments to them only in regular order. Makers estimate that 75 to 85 per cent of the bolt and nut product is going into direct and indirect Government orders. A new inquiry for 6500 tons of rivets for Hog Island has come from the American International Shipbuilding Corporation, and it is expected that this business will be placed in a few days. Specifications on rivet contracts are very heavy.

Finished Iron and Steel.—The steel situation is growing tighter. The demand for plate continues very heavy and consumers not having high priority orders have little chance of getting material. New Government allocations include approximately 70,000 tons of plates for the corrugated ends of box cars, a portion of which went to a Cleveland mill. The situation in regard to jobbers shows little, if any, improvement. Under the present regulations, jobbers are able to place orders, but mills are so well filled up with priority orders that shipments to jobbing houses are very indefinite and there is a heavy call on jobbers for material they do not have in stock, particularly plates and structural material. Shipments to jobbers are largely of steel bars, cold-rolled steel and structural angles in small sizes, the latter rolled from shell discard. Few manufacturers are now trying to do anything but war essential work and the demand for small lots of steel to finish up other classes of work which has existed for some time has quieted down. There is a heavy demand for shell discard, which is going to light rails, reinforcing bars and to the implement and automobile manufacturers. Considerable of this material is being disposed of by Cleveland jobbers, one of whom has just placed an additional order with a Pittsburgh mill for 1000 tons. Automobile manufacturers are also able to secure some off heats of alloy steel and some material from the strip mills. Local fabricators of steel have stocks from which they are able to fill small orders for building work. Jobbers quote:

Steel bars, 4.07c.; plates, 4.42c.; structural material, 4.17c.; No. 10 blue annealed sheets, 5.42c.; No. 28 black sheets, 6.42c.; No. 28 galvanized sheets, 7.67c.

Cincinnati

CINCINNATI, July 30—(By Wire).

Pig Iron.—Reports cannot be confirmed that an official hint has been passed along the line discouraging making contracts for next year's delivery. However, some credence may be given to these rumors because a few Southern furnaces which were willing to take on business for the first half have practically withdrawn from the market and are not selling any iron with the exception of some small odd lots of high-sulphur iron. For prompt shipment most of this metal is being taken by the manufacturers of stoves whose future supplies have practically been cut off. The distribution of basic iron is absorbing the attention of everyone at the present time and the allocation of all steel-making iron is more rigidly enforced. Furnaces able to make basic iron are being directed to change from the production of foundry iron and this action on their part has already caused an increased shortage of the latter product, in Southern Ohio and also in the South. Fortunately the cool weather has tended to aid in furnace operations to a considerable extent, although even if the furnaces are able to run at full capacity through the remainder of the summer season, a number of them in the Ironton district as well as in the South will not be able to produce enough iron to take care of their customers' needs during the remainder of the present year. Lately few inquiries have been received here for malleable and

it is probable that consumers are drawing from other districts.

Based on freight rates of \$3.60 from Birmingham and \$1.50 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, No. 2 foundry and No. 2 soft, ..	\$36.50
Southern Ohio, No. 2	34.50
Basic, Northern	32.50

Finished Material.—Twisted steel bars for reinforcing concrete are very hard to get. The jobbers' stocks have practically been depleted and promises of mill shipments have not been kept. This situation delays a great deal of work that is of a very essential nature. The jobbers have reason to believe that the situation may be relieved within the next 30 days. One encouraging feature is better deliveries of cold rolled shafting and of blue annealed sheets. Galvanized sheets are almost impossible to obtain, and at the annual convention of the Ohio Sheet Metal Contractors' Association held at Columbus last week, it was developed that a number of contractors will be compelled to suspend operations at an early date, unless they can draw stocks necessary to carry on their work. No shipments from the mills of barbed wire have been received lately and all local stocks have been exhausted. Wire nails are also very scarce and there is some talk on the part of the jobbers of cutting down shipments to retail dealers, so that their limited supply can be evenly distributed. Recently a jobbing house quoted \$4.50 per keg base to an outside firm to discourage its order, but the order was sent in by telegraph. This illustrates how tight the situation is becoming.

The following are local jobbers' prices: Steel bars and small structural shapes, 4.13c. base; large rounds and squares 2 in. and over, 4.23c. base; plates, 4.48c. base; No. 10 blue annealed sheets, 5.48c.; steel bands, 3/16 in. and lighter, 4.98c. base (using the new band list). Reinforcing concrete bars, 4.23c., and wire nails, \$4.25 per keg base.

Old Material.—Dealers are making a more determined effort to gather in scrap of all kinds from the country districts. In carrying out this campaign, they feel that they are assisting the Government in a very material way by locating every pound of metal possible. Lately quite a large tonnage of agricultural scrap has been passed into the yards and is being returned after sorting to the manufacturers of agricultural implements and other melters. No changes in quotations are noted, but prices are very much firmer.

Per Gross Ton	
Bundled sheet scrap	\$21.00 to \$21.50
Old iron rails	33.50 to 34.00
Relaying rails, 50 lb. and up	44.50 to 45.00
Rerolling steel rails	32.00 to 32.50
Heavy melting steel scrap	27.50 to 28.00
Steel rails for melting	27.50 to 28.00
Old carwheels	28.50 to 29.00

Per Net Ton	
No. 1 railroad wrought	\$29.00 to \$29.50
Cast borings	14.00 to 14.50
Steel turnings	14.50 to 15.00
Railroad cast	25.00 to 25.50
No. 1 machinery	27.50 to 28.00
Burnt scrap	17.50 to 18.00
Iron axles	40.00 to 40.50
Locomotive tires (smooth inside)	35.50 to 36.00
Pipes and flues	21.00 to 21.50
Malleable cast	24.50 to 25.00
Railroad tank and sheet	18.50 to 19.00

Coke.—A number of oven operators have opened their books for 1919 and are giving their regular customers a chance to cover for their requirements of foundry coke. All contracts stipulate that Government prices shall rule at the time of shipment. Buying has been heavy of 72-hr. coke, but the invitation has not been generally extended to the users of furnace coke, as it is generally understood that the urgent war needs require that these consumers of furnace coke are to be supplied before others are taken care of. Shipments are moving very satisfactorily, and there are few complaints as to car shortages in any district. Reports from all districts are more optimistic as to the labor situation. A consequence is an increased production of both furnace and foundry coke.

Fluorspar.—The average price for both prompt shipment and delivery during the remainder of the year has narrowed down to \$30 per ton, f.o.b. point of shipment. A little extra business is being done for this year's delivery, but in the past two weeks practically no

orders have been accepted for next year's shipment. An effort is being made by consumers to accumulate a supply during the summer season so as to avoid the embarrassment in delayed shipments occasioned by the cold weather.

IRON AND INDUSTRIAL STOCKS

Market Stationary—Favorable War News Has Little Effect

NEW YORK, July 30.

The stock market last week, especially as regards prominent steel and metal-working company shares, showed less change than for many weeks preceding. Public participation in transactions was of small dimensions, and favorable war developments failed to affect quotations appreciably.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalmers com.	32% - 34%	Lackaw. Steel ..	82 - 84
Allis-Chalmers pf.	82% - 83%	Lake Supr. Corp.	19% - 20%
Am. Can. com.	46% - 47%	Lima Loco.	45% - 46%
Am. Can. pf.	93% - 94%	Midvale Steel	50% - 52%
Am. Car & Fdry. com.	83% - 85%	Nat.-Acme	30
Am. Loco. com.	66 - 67%	Nat. Enam. & Stm. com.	50% - 51%
Am. Ship com.	123 - 124%	N. Y. Air Brake.	124% - 127
Am. Ship pf.	90	Nova Scotia Steel 60 - 61	
Am. Steel Fdries.	71% - 75%	Pittsburgh Stl. pf.	93
Bald. Loco. com.	87% - 91%	Pressed Stl. com.	67% - 71
Bald. Loco. pf.	100%	Pressed Steel pf.	95% - 96
Beth. Steel com.	82% - 84%	Ry. Steel Spring com.	60% - 62%
Beth. Stl. Cl. B.	81% - 83%	Ry. Steel Spring pf.	99% - 99%
Chic. Pneu. Tool.	68 - 68%	Republic com.	90 - 93
Colo. Fuel	45 - 47	Republic pf.	100% - 101
Cruc. Steel com.	64% - 67%	Sloss pf.	93%
Cruc. Steel pf.	90%	Un. Alloy Steel.	38
Gen. Electric	143% - 145%	U. S. Pipe com.	14%
Gt. No. Ore Cert.	31% - 31%	U. S. Steel com.	104% - 108%
Gulf States Steel.	83 - 83%	U. S. Steel pf.	111% - 112%
Int. Har. of N. J. com.	124% - 125	Va. I. C. & Coke.	73 - 73%
Int. Har. of N. J. pf.	112	Warwick	8%
Int. Har. Corp. com.	65 - 66	Westingh. Elec.	41% - 42%

Dividends

The American Brass Co., quarterly, 1½ per cent and 3½ per cent, payable Aug. 15.

The Bethlehem Steel Co., quarterly, 2½ per cent on the common and 2½ per cent on class B common, payable Oct. 1.

The Canada Foundries & Forgings, quarterly, 3 per cent on the common and 1½ per cent on the preferred, payable Aug. 15.

The Penn Seaboard Steel Corporation, quarterly, \$1.50, payable Aug. 1.

The Pressed Steel Car Co., quarterly 2 per cent on the common, payable Sept. 4, and 1½ per cent on the preferred, payable Aug. 27.

The Sloss-Sheffield Steel & Iron Co., quarterly, 1½ per cent on the common, payable Aug. 10.

The Stewart-Warner Speedometer Co., quarterly, 1½ per cent, payable Aug. 15.

The Universal Foundry Co., semi-annual, 5 per cent, payable July 20.

The Yale & Towne Mfg. Co., quarterly, 2½ per cent, payable Oct. 1.

Industrial Finances

A special meeting of stockholders of the Bethlehem Steel Corporation has been called for Aug. 8 in Newark, N. J., for the following purposes: To authorize \$500,000, 000 bonds under a consolidated mortgage covering all the property and assets of both Bethlehem Steel Co. and Bethlehem Steel Corporation; to consent to the issuance of \$70,000,000 bonds under the aforesaid mortgage to secure the issue of \$50,000,000 7 per cent notes; and to ratify the sale of these notes to the banking syndicate formed by the Guaranty Trust Co., Bankers' Trust Co., J. & W. Seligman & Co. and Chase Securities Corporation.

The sale of the Regal Motor Car Co., Detroit, to Maurice Rothschild for \$485,000 by the Security Trust Co., receiver, was confirmed by the court in that city last week. The plant was appraised at \$1,000,000 a short time ago, but the falling off in demand for cars cut down the value.

That the Ontario Steel Products Co., Ltd., with plants at Gananoque and Chatham, Ont., has experienced a good year is evident from the annual report

of the directors, just issued. The net profits for the year, after providing for depreciation, business-profits tax, etc., were \$208,108. The fixed assets of the company are \$1,848,558. During the year which closed June 30 last the regular dividend of 7 per cent on the preferred stock was declared, and 1½ per cent on the common deferred dividends was paid in August, 1917. At a meeting of the directors, held during July, a further payment of 1½ per cent on account of these arrears, to be payable concurrently with the regular dividend of 1½ per cent on August 15, was also decided upon. With the above payment the arrears will be reduced to 4½ per cent.

The Hydraulic Pressed Steel Co., Cleveland, has sold to a Cleveland banking house \$3,500,000 first mortgage and collateral trust three-year 7 per cent gold notes, the notes being secured by first mortgage by the plants of the Hydraulic Pressed Steel Co. and the Cleveland Welding & Mfg. Co., and collateral secured by obligations on the company's Canton Sheet Steel Plant, Canton, Ohio. Of the proceeds, \$1,800,000 will be used to refund notes due Oct. 1 this year, and the remaining will be devoted to the reduction of current liabilities and to permanent improvements at the three plants.

The Allis-Chalmers Mfg. Co. reports net profits of \$1,888,755 for the quarter ended June 30, compared with \$1,002,455 in the corresponding three months of last year. Sales billed aggregate a value of \$9,238,079, against \$6,441,574 a year ago. The unfilled orders on the books of the company on June 30 amounted to \$28,962,096, compared with \$16,564,842 a year ago.

The re-organization of the Garland Corporation of Pittsburgh, which has been in the hands of receivers for several years, is nearly completed, and it is expected that in a few weeks the receivership will be dissolved, and the companies for which the Garland Corporation is a holding company, will be turned back to the stockholders. These companies include the Garland Nut & Bolt Co., the Safety Armorite Conduit Co., with plants at West Pittsburgh, Pa., and the West Pittsburgh Realty Co. After the receivership is discharged, it is the intention to consolidate the manufacturing interests and conduct them under one name. It is stated that operations under the receivership have been very successful, and it is believed the companies will continue to prosper after they are again placed in the hands of the stockholders.

Colorado Fuel & Iron Co. Report

The Colorado Fuel & Iron Co. reports gross receipts for the quarter ended June 30, 1918, of \$12,812,003, from which operating expenses of \$10,474,161 were deducted, leaving net earnings of \$2,337,842, compared with \$2,553,080 for the corresponding quarter of the preceding year. Other income amounted to \$128,124, bringing the total income for the period to \$2,465,966, which compares with \$2,881,366 for the same months of the year before. After interest, taxes, etc., of \$765,795, balance available for depreciation and depletion totalled \$1,700,170. Preferred dividends paid during the quarter were \$40,000, the same amount paid in corresponding period of 1917. Balance after preferred dividends was equal to \$3.41 per share, against \$4.49 per share earned in the same quarter of the previous year. Common dividends amounted to \$256,718, leaving a surplus for the quarter of \$912,435.

The Associated Manufacturers of Electrical Supplies, 30 East Forty-second Street, New York, has adopted standard dimensions and other specifications for porcelain enameled steel reflectors under the name R-L-M, meaning reflector and lamp manufacturers' standard. At present they will be confined to the dome types for direct lighting.

For transporting supplies for every million men of our expeditionary forces in France, 2000 locomotives are necessary, according to S. M. Vauclain, vice-president Baldwin Locomotive Works. The company has recently contracted to build 500 locomotives, 25 per week.

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery

Copper, New York		Tin,	Lead—		Spelter	
Lake	Electro-	New York	New York	St. Louis	New York	St. Louis
July						
24.....	26.00	26.00	*94.00	8.05	7.75	8.62½
25.....	26.00	26.00	*94.00	8.05	7.75	8.50
26.....	26.00	26.00	*94.00	8.05	7.75	8.50
27.....	26.00	26.00		8.05	7.75	8.37½
28.....	26.00	26.00		8.05	7.75	8.12½
29.....	26.00	26.00	*94.00	8.05	7.75	8.37½
30.....	26.00	26.00	*94.00	8.05	7.75	8.25

*Nominal.

NEW YORK, July 31.

All the markets are quiet and all are strong except one. Copper can now be bought for delivery only at the price ruling at that time. Tin is both quiet and scarce. Lead continues very scarce and firm. Antimony is dull but fairly strong.

New York

Copper.—The market is strong. It is really marking time until the result of the meeting next week, Aug. 7, is known. Confidence is strong that an advance will then be granted bringing the maximum price to 27.50c. per lb. after Aug. 15, due to the reasons mentioned last week. As a result of this situation no sales are being made for delivery beyond Aug. 15 except at the price ruling then. In fact, it is stated that producers are not over-willing to sell for delivery before that at the present price of 26c. so as to accumulate stocks if possible for sale at a higher price. In most cases, however, consumers are well covered to Aug. 15. For jobbing lots, besides the 5 per cent extra allowed, an additional \$1 per ton is permissibly added to recompense refiners for converting the copper into ingots. This makes the maximum jobbing price for 5-ton lots and less, 27.35c. per lb.

Tin.—Because of the new ruling as to shipments from the Far East, referred to last week, there has been practically no business. Those interested in this market do not know just where they stand. A few lots, perhaps a half dozen, have been offered and sold but it is the opinion of one large importer that this has been done only to test out the new program. Tin of all grades is very scarce. Buyers do not appear to be at all anxious and seem willing to drift along with the market. Spot metal at New York is still nominal at 94c. per lb. Arrivals for the month at Atlantic ports to July 24 have been 775 tons with 5260 tons reported as arrived at Pacific ports to July 27. Tin continues to advance in London. Spot Straits was quoted yesterday at £385, against £365 10s per ton a week ago.

Lead.—The same conditions dominate the market which have obtained the past few weeks. The shortage of metal continues and is greater, if anything, and there is still a decided uncertainty about freight rates. The market is no better than firm and is nominal at 8.05c. New York, or 7.75c. per lb., St. Louis. There is very little business and practically no metal available for spot or August delivery. In less than carloads, the metal is available at a premium up to 8.75c. per lb. New York.

Spelter.—The market continues to ease with prime Western now quoted at 8c. St. Louis, or 8.25c. per lb. New York, for early delivery and third quarter. Demand is small, but the underlying conditions are regarded as sound and the reaction as temporary. It is expected that the easing will discourage the resumption of production by some who had discontinued. A new feature of the market is the weekly reports now being issued by the Government showing the production and stocks of spelter.

Antimony.—The market is quiet and dull at 13c. to 13.25c. per lb., New York, duty paid, for prompt and early delivery. Imports of metal and regulus for the 11 months ended May 31, 1918, are reported as

38,148,949 lb. as compared with 22,604,460 lb. in the same period in 1917. It is stated that a duty of 7c. per lb. is seriously contemplated to increase the output in this country.

Aluminum.—No. 1 virgin metal, 98 to 99 per cent pure, and scrap, have a fixed maximum Government price of 33c. per lb. in 50-ton lots, of 33.10c. per lb. in 15 to 50-ton lots and of 33.20c. per lb. in 1 to 15-ton lots.

Old Metals.—Demand is very light. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible.....	26.00
Copper, heavy and wire.....	25.00
Copper, light and bottoms.....	23.00
Brass, heavy.....	17.75
Brass, light.....	13.00
Heavy machine composition.....	26.50
No. 1 yellow rod brass turnings.....	14.50-15.00
No. 1 red brass or composition turnings.....	23.50
Lead, heavy.....	7.825
Lead, tea.....	6.25
Zinc.....	6.50

Chicago

JULY 30.—The lead market can only be called nominal, as producers declare they have no metal to sell. Their statement that the Government is taking all the output is not accepted, and there is a movement on foot to have the Government take a hand in the situation. War requirements continue to draw heavily on the copper supply, but there appears to be enough for all purposes. Spot tin is a little easier, but futures are difficult to procure. Spelter is weak in a lifeless market. Antimony has been active, with unchanged quotations. We quote copper at 26c. for carloads and 27.30c. for less than carloads; tin, \$1 to \$1.05; lead, 7.85c., nominal; spelter, 8.25c. to 8.37½c.; antimony, 14c. to 15c. On old metals we quote buying prices, less than carload lots, as follows: Copper wire, crucible shapes, 22c.; copper clips, 21.50c.; copper bottoms, 20c.; red brass, 21c.; yellow brass, 14c.; lead pipe, 6c.; zinc, 5.50c.; pewter, No. 1, 55c.; tinfoil, 65c.; block tin, 70c.

St. Louis

ST. LOUIS, July 29.—Conditions in the non-ferrous metals markets have been rather quiet with prices fairly firm and the quotations car lots, at the close today: Lead, 7.75c.; spelter, 8.62½c.; less than car lots, lead, 8.50c.; spelter, 9.25c. to 9.50c. Tin is scarcely quotable, as none is available, but is worth \$1.10 or more in small lots; copper, 27.85c.; antimony, Asiatic, 16c. In the Joplin district, there was some restriction of production by the dry weather and the fact that ore prices showed very little change. Zinc blende was sold, as usual, at \$75 per ton, basis of 60 per cent metal, for top grades for sheet zinc producers' needs; while second grades ranged down to \$55 with some lots even below that, while the average for the week for the district was about \$60 per ton. Calamine continued in a wide range from \$25 to \$39 per ton because of the spotted character of the turn in, with average for the week, basis of 40 per cent metal, about \$34 per ton. Lead was quietly strong, basis of 80 per cent metal, at \$97.50 per ton and the average for the week for the district was \$97 per ton. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 10c.; heavy yellow brass, 14c.; heavy red brass, 19.50c.; heavy yellow brass, 18.50c.; heavy copper and copper wire, 20c.; pewter, 30c.; tinfoil, 60c.; lead, 6c.; zinc, 5c.; tea lead, 5c.

R. F. Wilson & Co. have been awarded the construction contract for the first unit of the steel hoop rolling mill to be erected by the Acme Steel Goods Co., at a cost of \$1,000,000, on the Little Calumet River. The company now has a plant at Twenty-eighth and Archer streets, Chicago. The first unit of the new mill will be a one-story structure, 85 x 700 ft., and will cost \$175,000. James E. MacMurray is president.

Maximum prices of sheet lead in Great Britain are now £41 per ton and of lead pipe £41 10s per ton.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

An advance in freight rates of 25 per cent from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, went into effect June 25, 1918. The rates from Pittsburgh, in carloads, to points named, per 100 lb. are as follows: New York, 24.5c.; Philadelphia, 23c.; Boston, 27c.; Buffalo, 17c.; Cleveland, 17c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49½c.; Denver, 99c.; Omaha, 59c.; minimum carload, 36,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, \$1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is \$1.315, minimum carload 40,000 lb.; and \$1.25, minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c., minimum carload 46,000 lb.; to St. Paul and Minneapolis, 49.5c., minimum carload 46,000 lb.; Denver, 99c., minimum carload 46,000 lb. A 3 per cent transportation tax applies. On iron and steel items not noted above, rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, structural sizes, 3c.

Wire Products

Wire nails, \$3.50 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails taking an advance over this price of \$2, and shorter than 1 in., \$2.50. Bright basic wire, \$3.35 per 100 lb.; annealed fence wire, Nos. 6 to 8, \$3.25; galvanized wire, \$3.95; galvanized barb wire and fence staples, \$4.35; painted barb wire, \$3.65; polished fence staples, \$3.65; cement-coated nails, \$3.40 base; these prices being subject to the usual advances for the smaller trade, all feb. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 47 per cent off list for carload lots, 46 per cent for 1000-rod lots, and 45 per cent off for small lots, feb. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....\$4.40 base
Large boiler rivets.....\$4.50
7/16 in. x 6 in. smaller and shorter rivets...50-10 per cent off list
Machine bolts h.p. nuts, ½ in. x 4 in.:
Smaller and shorter, rolled threads.....50-10-5 per cent off list
Cut threads.....50-5 per cent off list
Larger and longer sizes.....40-10 per cent off list
Machine bolts c.p.c. and t. nuts, ½ in. x 4 in.:
Smaller and shorter.....40-10 per cent off list
Larger and longer.....35-5 per cent off list
Carrage bolts, ¾ x 6 in.:
Smaller and shorter, rolled threads.....50-5 per cent off list
Cut threads.....40-10-5 per cent off list
Larger and longer sizes.....40 per cent off list
Lag bolts.....50-10 per cent off list
Flow bolts, Nos. 1, 2, 3.....50 per cent off list
Hot pressed nuts, sq. blank.....2.50c. per lb. off list
Hot pressed nuts, hex. blank.....2.30c. per lb. off list
Hot pressed nuts, sq. tapped.....2.30c. per lb. off list
Hot pressed nuts, hex. tapped.....2.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank.....2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped.....2.00c. per lb. off list
Semi-finished hex. nuts:
¾ in. and larger.....60-10-10 per cent off list
¾ in. and smaller.....70-5 per cent off list
Stove bolts.....70-10 per cent off list
Stove bolts.....2½ per cent extra for bulk
Tie bolts.....50-10-5 per cent off list
The above discounts are from present lists now in effect.
All prices carry standard extras.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$57; chain rods, \$65; screw, rivet and bolt rods and other rods of that character, \$65. Prices on high carbon rods are irregular. They range from \$70 to \$80, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16 in. x 4½ in. and heavier, per 100 lb., \$3.90, in lots of 200 kegs of 200 lb. each, or more; track bolts, \$4.90. Boat spikes, \$5.25 per 100 lb., f.o.b. Pittsburgh.

Terne Plate

Effective May 21 prices on all sizes of terne plates are as follows: 8-lb. coating, 200 lb., \$15 per package; 8-lb. coating, I. C., \$15.20; 12-lb. coating, I. C., \$17.00; 15-lb. coating, I. C., \$18.00; 20-lb. coating, I. C., \$19.60; 25-lb. coating, I. C., \$20.60; 30-lb. coating, I. C., \$21.75; 35-lb. coating, I. C., \$22.75; 40-lb. coating, I. C., \$24.00 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.90c. from mill, and 4.50c. to 5c. from warehouse in small lots for prompt shipment. Refined iron bars, 3.50c. in carload and larger lots, f.o.b. mill.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, as announced Nov. 5 by the Government on steel pipe, those on iron pipe being the same as quoted for some time:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
½, ¾ and 1.....	44	17½	¾ and 1.....	23	+4
1.....	45	33½	1.....	24	+3
1½ to 3.....	51	37½	1½ to 1¾.....	28	10
				33	17
Lap Weld			Lap Weld		
2.....	44	31½	1½.....	18	3
2½ to 6.....	47	34½	1¾.....	26	11
7 to 12.....	44	30½	2.....	26	12
13 and 14.....	34½	..	2½ to 6.....	28	15
15.....	32	..	7 to 12.....	25	12
Butt Weld, extra strong, plain ends			Butt Weld, extra strong, plain ends		
¾, 1 and 1½.....	40	22½	¾, 1 and 1½.....	22	5
1½.....	45	32½	1½ to 1¾.....	27	14
1¾ to 1½.....	49	36½		33	18
2 to 3.....	50	37½			
Lap Weld, extra strong, plain ends			Lap Weld, extra strong, plain ends		
2.....	42	30½	1½.....	19	4
2½ to 4.....	45	33½	1¾.....	25	11
4½ to 6.....	44	32½	2.....	27	14
7 to 8.....	40	26½	2½ to 4.....	29	17
9 to 12.....	35	21½	4½ to 6.....	28	16
			7 to 8.....	20	8
			9 to 12.....	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5½ points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh, announced Nov. 13, as agreed upon by manufacturers and the Government:

Lap Welded Steel		Charcoal Iron	
3½ to 4½ in.....	34	3½ to 4½ in.....	12½
2½ to 3½ in.....	24	3 to 3½ in.....	+5
2½ in.....	17½	2½ to 2¾ in.....	+7½
1½ to 2 in.....	13	2 to 2½ in.....	+22½
		1½ to 1¾ in.....	+35
Standard Commercial Seamless—Cold Drawn or Hot Rolled		Standard Commercial Seamless—Cold Drawn or Hot Rolled	
Per Net Ton		Per Net Ton	
1 in.....	\$340	1½ in.....	\$220
1¼ in.....	280	2 to 2½ in.....	190
1½ in.....	270	2½ to 3½ in.....	180
1¾ in.....	220	4 in.....	200
		4½ to 5 in.....	220

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots, are as follows:

Blue Annealed—Bessemer		Cents per lb.	
No. 8 and heavier.....			4.20
Nos. 9 and 10.....			4.25
Nos. 11 and 12.....			4.30
Nos. 13 and 14.....			4.35
Nos. 15 and 16.....			4.45
Rox Annealed, One Pass Cold Rolled—Bessemer		Cents per lb.	
Nos. 17 to 21.....			4.80
Nos. 22 and 24.....			4.85
Nos. 25 and 26.....			4.90
No. 27.....			4.95
No. 28.....			5.00
No. 29.....			5.10
No. 30.....			5.20
Galvanized Black Sheet Gage—Bessemer		Cents per lb.	
Nos. 10 and 11.....			5.25
Nos. 12 and 14.....			5.35
Nos. 15 and 16.....			5.50
Nos. 17 to 21.....			5.65
Nos. 22 and 24.....			5.80
Nos. 25 and 26.....			5.95
No. 27.....			6.10
No. 28.....			6.25
No. 29.....			6.50
No. 30.....			6.75
Tin-Mill Black Plate—Bessemer		Cents per lb.	
Nos. 15 and 16.....			4.80
Nos. 17 to 21.....			4.85
Nos. 22 to 24.....			4.90
Nos. 25 and 27.....			4.95
No. 28.....			5.00
No. 29.....			5.05
No. 30.....			5.05
Nos. 30½ and 31.....			5.10

PRIORITY POLICIES

Applications of New Regulations to Steel and Steel Products

Concerning the specific application of the new priority regulations to the distribution of steel and steel products, published elsewhere in this issue, the Priorities Division of the War Industries Board has issued a statement which will hereafter be known as circular No. 5, as follows:

To all Producers, Manufacturers, Dealers and Consumers:

SEC. I. *The problem.*—The nation's present business—your present business—is war. When this fact shall have taken firm root in the hearts and minds of the men, women, and children of this country, our industrial problems will be found comparatively easy of solution, and the task of readjusting and mobilizing the industries of the nation to meet the requirements of the military program more than half discharged.

For the winning of the war steel is now the world's most precious metal. It is consumed, or used to some extent, every day by practically every civilized man in every civilized country, and nowhere in such vast quantities per capita as in the United States. The present and constantly increasing steel requirements of this country and its allies for direct and indirect war needs, 100 per cent of which must under any and all circumstances be promptly supplied, are so enormous as to well-nigh absorb our constantly expanding producing capacity. The result is obvious. There will be comparatively little iron and steel left to distribute to those industries engaged in non-war work and to consumers for application to non-war uses. Every possible use of iron and steel or their products which can be deferred must be deferred until after the war. This duty is *personal* and can not be avoided or delegated to your friends and neighbors. No consumption is so small as to be immaterial, and no saving insignificant. Every pound collected and sold to scrap-iron dealers finds its way back into the general supply of iron and steel. "The last quarter hour will win the war," and in that quarter hour the last shell will be fired. That shell may be fired from steel that has been saved through the collection of scrap or through denial of the luxury of purchasing steel in the form of articles which have come to be regarded as peace-time necessities.

Among other tasks which the President has laid upon the War Industries Board is that of so distributing the supply of iron and steel available, or which can be made available, as to meet the war requirements and as far as possible the essential needs of the civilian population. This task is being discharged in part through the administration of priorities.

The Priority Plan

SEC. II.—The term "priority" implies discrimination—purposeful discrimination. All priorities are relative and the classifications are based upon the relative importance of the particular industry or the particular plant involved to the war program or to supplying the *essential needs* (as distinguished from *wants*) of the civilian population.

Careful attention is invited to sections 1 to 11, inclusive, of the accompanying copy of circular No. 4 issued by the Priorities Division of the War Industries Board under date of July 1, 1918, which sections prescribe five principal classes into which all orders and work are divided with subdivisions thereof, and which also provide a method for classifying all orders and work.

It will be noted that priority certificates are issued covering three classes, namely class AA, class A, and class B. Class C comprises all orders and work not covered by priority certificates or taking a class A or class B automatic rating, but which are embraced within the "General Classification of Purposes Demanding Preference Treatment," appearing on page 17 of circular No. 4, or which orders and work are placed by or are to be utilized in connection with an industry or plant appearing on preference list No. 1 prepared by

the Priorities Board and appearing on pages 18 and 19 of circular No. 4. In the majority of cases the application of the classification of purposes and the preference list to orders received by manufacturers, jobbers, or retailers can readily and accurately be made.

The Purpose List

SEC. III. Communications have been received by the Priorities Committee from manufacturers, jobbers, and retailers expressing doubt as to whether or not certain specified uses fall within the classification of purposes entitled to preference treatment. In order to insure uniformity and consistency in the distribution of steel and its products, the Priorities Committee will undertake, on application, to decide all such doubtful cases, and from time to time issue as a supplement to this circular No. 5 administrative rulings embodying such decisions as are of general interest, and also defining the term "essential uses" as used in the pledge appearing on page 3 of the bulletin issued July 3, 1918, a copy of which also accompanies this circular.

Rationing Industries

SEC. IV. As it is obviously impossible to supply all industries utilizing iron and steel in their activities with their normal supply, the War Industries Board, through its Priorities Division, co-operating with the commodity section dealing with the particular industry or product involved, with the Conservation Division and representatives of other interested Government agencies, has inaugurated a system of industrial hearings in which committees representing the entire industry appear and present (a) the normal requirements of such industry for iron and steel, (b) their reasonable requirements under war conditions, (c) the stocks now on hand in each plant, and (d) the fuel consumed, and all other pertinent facts.

A portion at least of the product of nearly every industry may be properly classed as a direct or indirect war requirement or essential to the civilian population, but in many the percentage of nonessentiality predominates. On the other hand, nearly every industry, including so-called war industries, has a percentage of non-essentiality in its production.

Taking Counsel

It is the policy of the War Industries Board, through the hearings mentioned, to take counsel with each industry, determine the extent to which it can and should as a war measure curtail its production—and particularly curtail its consumption of iron and steel—limiting its output to essential uses as far as practicable, but without destroying or unnecessarily injuring any industry or legitimate business. On these hearings the chairman of the Conservation Division or his representative gives the industry the benefit of his expert knowledge and research into methods of standardization and substitution, and co-operation with the industry in (a) reducing needless lines, varieties and sizes of products, thereby securing economy in manufacture and reducing the volume of stocks which the manufacturer, wholesaler and dealer are required to carry, (b) through the elimination of wasteful styles, models and methods, greatly conserving materials, and (c) through the substitution of products or materials not needed for those that are needed for war work, conserving the latter without unnecessarily reducing the output of the industry.

When the maximum conservation of materials and products has been attained through these processes of standardization, substitution and curtailment, the representatives of the War Industries Board participating in these conferences indicate to the industry their views as to the maximum consumption by the industries of the materials and products in question, treating the industry as a unit where such a course is practicable.

The chief of the commodity section dealing with the particular industry then prepares a schedule apportioning such indicated maximum of materials or products to each plant on a basis which will enable each member of the industry to procure the same per cent of his normal production as all other members, taking

into account the existing stocks of each. When this has been done, each plant places its orders for the amount apportioned to it with its regular sources of supply, and such orders take a class C rating.

The war service committees of those industries which have not as yet participated in such hearings will be given an appointment on application to the Priorities Commissioner or to the chief of the appropriate commodity section of the War Industries Board.

Subsidiary Pledges

SEC. V.—Complying with the requests from numerous sources to be furnished with forms of pledges which jobbers are required to exact from customers or retailers under the terms of the jobbers' pledge set forth on the third page of the accompanying bulletin of July 3, 1918, the following is prescribed:

I do hereby pledge myself not to use, or as far as lies within my power permit the use of, any stocks now in, or which may hereafter come into, my possession or control, save for essential uses, as that term may be defined from time to time by the Priorities Division of the War Industries Board; that I will not hoard, or countenance the hoarding of, stocks, and will use my utmost endeavor to insure that they be distributed and applied solely to essential uses.

Resales

SEC. VI.—As all pig iron and steel manufactured products are being distributed under the direction of the War Industries Board according to the relative importance, as measured by the public interest, of the uses to which it is to be devoted, it is obviously improper for any manufacturer, jobber or dealer to dispose of any stocks of raw materials or semi-finished products now in, or which may hereafter come into, his possession, whether obtained through priority direction or otherwise, save with the express approval of the Priorities Division, or the general authority embodied in circular No. 4 or the bulletin of July 3, 1918, both above mentioned. No manufacturer, jobber, or dealer violating this rule can expect favorable consideration of any application for priority which he may subsequently make.

What Is Required

It is imperative that every manufacturer, jobber and retailer of iron and steel products should fully realize and make his salesmen and customers realize that his attitude toward his trade is exactly the reverse of that in normal times. It requires no salesmanship merely to sell goods where the demand greatly exceeds the supply, but it does require real salesmanship and a high degree of patriotism to sell with discrimination with a view of limiting the purchases to strictly essential uses, the controlling consideration being, Where can these stocks be best placed in the public interest?

While the several divisions of the War Industries Board are anxious to assist you, and will not hesitate as occasion may require to direct you, this nevertheless is *your* problem. With confidence we look to you for such policing of the distribution of iron and steel products as will insure each pound being applied *only* to essential uses.

New By-Product Coke Plant at Birmingham

BIRMINGHAM, ALA., July 30.—Morris Bush, president Imperial Coal Co. and Shelby Iron Works, and Horace Hammond, Hammond-Byrd Co., announce a contract with the Government for the immediate construction under Government aid of a \$3,000,000 by-product coke plant on the outskirts of Birmingham. The Government will take chemical products for the nitrate plant at Muscle Shoals.

Exports of Ferrotitanium

Up to October, 1917, exports of ferro-carbon-titanium continued to expand, but since then they have declined due to shipping restrictions, though some is still going to Japan. Up to Oct. 1, the 1917 exports had been 750,000 lb., which contrasts with 471,500 lb. in the calendar year 1915 and 170,240 lb. in 1914.

RAPID WORK IN SHIPBUILDING

No Less Than 162 Yards, of Which 118 Are Practically Complete

WASHINGTON, July 30.—So rapid has been the progress in the development of American shipyards during the past year that to-day there are no less than 162 plants in the country, 118 of them practically complete, according to an official statement by Chairman Hurley of the Shipping Board. Of the total number, 53 are new yards, constructed since our declaration of war, and 46 are still in process of construction, 23 of them between 75 and 100 per cent completed; 3 of them between 25 and 50 per cent, while only 6 are less than 25 per cent completed. At the time of our entrance into the war there were 37 steel shipyards in America. To-day there are 72, and the old yards have been enlarged from a capacity of 162 ways to 195, and more are being added. The 24 wooden shipyards of 1916 have been increased to 80.

Among the 45 yards under construction are the four so-called fabricating yards at Hog Island, Bristol, Wilmington, N. C., and Newark Bay, N. J. These four yards, when fully completed, will have a grand total of 96 ways, and when they are in full operation will produce in a single year more ships than England, the greatest maritime nation in the world, has ever been able to turn out in the same length of time.

Hog Island, the modern wonder in shipbuilding, is to-day 90 per cent completed, and within a few weeks its 50 ways will begin to pour an almost daily stream of hulls into the Delaware River. Bristol, with its 12 ways, is virtually a finished yard. The assembling plant of the Carolina Shipbuilding Co. was only begun in May, and is still in its infancy.

Wherever expansion can be efficiently secured the United States Shipping Board, Emergency Fleet Corporation, is lending its aid to increase the capacity of American shipyards. Within the past 10 days 18 new ways have been added to the grand total of the country. The Alameda plant of the Bethlehem Shipbuilding Corporation in California has been authorized to add 10 new ways, at an estimated cost of \$20,000,000. The Sparrows Point yard in Maryland is adding three additional ways, at an estimated cost of \$3,000,000. The New York Shipbuilding Corporation, Camden, N. J., is building five additional ways at an estimated cost of \$7,000,000.

The 118 shipyards practically completed are situated as follows: 48 on the Pacific coast, 38 on the Atlantic coast, 16 on the Great Lakes, and 16 on the Gulf. Of the 25 yards which are completed between 75 and 100 per cent, 1 is on the Pacific coast, 17 on the Atlantic coast, and 7 on the Gulf. Four of the yards which are 50 to 75 per cent completed are on the Pacific coast, while 2 are on the Atlantic coast and 1 on the Gulf. Three yards are completed between 25 and 50 per cent. One of these yards is on the Pacific coast and 2 on the Atlantic coast. There are 6 yards which are less than 25 per cent completed, 3 of them on the Atlantic coast, 2 on the Pacific coast, and 1 on the Gulf.

Concrete ships will be built at the following places: Flushing Bay, L. I., Wilmington, N. C., Brunswick, Ga., Jacksonville, Fla., San Francisco, Cal., Mobile, Ala., and San Diego, Cal. These seven yards are in the process of continual expansion, and their original six ways have now been increased to 22. The future for concrete ships has become so assured that there is likely to be greater new activity in the concrete shipyards than perhaps in the steel and wooden.

These figures furnish a summary of the tremendous work accomplished in building our shipyards, and give but the slightest hint of the stupendous task that has been completed in bringing this end of the nation's shipping program to its triumphant accomplishment. As Chairman Hurley of the Shipping Board has said: "It took Germany 40 years to build up her military machine. In less than eight months we have built up a shipbuilding machine, which, when it gets into full swing, will defeat the military machine of Germany."

PERSONAL

George M. Brill has been appointed head of the requirement section of the Emergency Fleet Corporation, "to keep in touch with the shipyards and learn from them in a general way the amount of materials, supplies and equipment required for extensions." He is already head of the requirement section of the United States Shipping Board.

H. W. Belnap, formerly chief of the Bureau of Safety in the Interstate Commerce Commission, has been transferred to the Safety Section of the Federal Railroad Administration. W. P. Borland is now chief of the Division of Safety of the commission.

C. M. White, Jr., has been appointed sales manager of the Firestone Steel Products Co., Akron, Ohio. He was formerly connected with the Detroit Steel Products Co., Detroit.

A number of changes have recently been made in the organization of the Standard Parts Co., Cleveland. W. L. Woodward has been promoted from assistant manager to manager of the rim and tube plant in Cleveland, succeeding J. C. Manternach. F. F. Grimselman, formerly assistant manager of the spring and axle plant in Canton, has been made manager of the Perfection spring plant in Cleveland. J. L. Loose, formerly with the Hendee Mfg. Co., has been made manager of the spring and axle plant in Canton, succeeding J. B. Childe, who is now connected with the general office organization in Cleveland. B. R. Winborn, formerly general manager of the Perfection Heater sales force, has been made general manager of that division. H. H. Newsom, director of purchases, has been called into service by the aircraft division of the Government and has been granted six months absence. He is located at the plant of the Livingston Radiator Co., New York.

Terrell Croft, consulting electrical engineer of St. Louis, has been called to Washington by the educational committee of the War Department to assume charge of the work of standardizing the electrical courses of training for enlisted men.

Henry De Bardeleen, Birmingham, Ala., Warrior River coal operator, has been appointed manager of the Warrior River division of the Mississippi-Warrior Federal barge line, of which M. J. Sanders, Leyland Steamship Co., New Orleans, has been named director, and Theodore Brent, New Orleans, traffic manager. Standard barges are to be built.

Herbert Farrell, president Farrell Cheek Steel Foundry Co., Sandusky, Ohio, has been made treasurer and chairman of the executive committee of the Dauch Mfg. Co., Sandusky, Ohio, which manufactures farm tractors.

F. H. Charbono, who for many years has represented the Independent Pneumatic Tool Co. in the East, traveling out of the New York office, has just been appointed manager of the Southern district, with headquarters at No. 1721 Jefferson County Bank Building, Birmingham, Ala. Mr. Charbono succeeds George C. Wilson, who has resigned to look after his interests in the North.

At a meeting held July 23 of the directors of the Stocker-Rumely-Wachs Co., dealer in machine tools, 117 North Jefferson Street, Chicago, William N. Rumely, formerly vice-president, was elected president to fill the vacancy caused by the recent death of H. A. Stocker. A. J. Sullivan, long connected with the firm, was elected a member of the board of directors, and C. L. Wachs, always a director, was made vice-president. The other offices remain the same as they have been since the organization of the company, and there will be no change in its policy.

Harry J. Warner has been made vice-president of the Federal Motor Truck Co., Detroit, and a member of the executive committee and board of directors, hav-

ing complete charge of production. Mr. Warner was for 12 years with the Continental Motors Corporation, where for six years he was vice-president in charge of production.

Fred. Berger, who was chief engineer of the Abbott Motor Corporation, Cleveland, and when in Detroit, chief engineer of the Oakland Car Co., Pontiac, Mich., and sales manager of the Muir Carburetor Co., which position he resigned to join the Abbott company, has returned to Detroit as engineer of the Gray Motors Co.

Lieut. Daniel B. McCarthy, who was connected with the American Car & Foundry Co. at St. Louis before entering the Engineers' Corps, has arrived in France.

W. H. Workman, general manager Handley-Page Airplane Co., London, Eng., is due in St. Louis early in August to confer with the St. Louis Chamber of Commerce and the Manufacturers' Association regarding the possible establishment at St. Louis of a plant for the manufacture of airplanes.

E. J. Kearney, secretary and treasurer Kearney & Trecker Co., Milwaukee, and F. H. Claussen, president Van Brunt Mfg. Co., Horicon, Wis., have accepted appointment as representatives of the manufacturers on the Wisconsin State War Labor Board. George P. Hambrecht, chairman Industrial Commission of Wisconsin, is Federal representative.

William L. Lindsley, formerly of the Trumbull Steel Co., Warren, Ohio, has joined the sales organization of the W. J. Crouch Co., Inc., steel exporter, 68 William Street, New York.

Maurice D. Langhorne, for several years blast furnace superintendent of Pulaski Iron Co., Virginia, but more recently connected with the Lavino Furnace Co., has been appointed superintendent of the Seaboard Steel & Manganese Corporation, Temple, Pa.

F. W. Glover has resigned as head of the perforated metal department of the Clinton Wire Cloth Co., Clinton, Mass., the resignation taking effect July 27. He had held this position for approximately the past 10 years and has made no plans for the future.

William V. Dee, until recently secretary and general sales manager of the G. Drouve Co., Bridgeport, Conn., has resigned.

At a special meeting of the board of directors of the Lansdale Foundry Co., Lansdale, Pa., E. B. Keller was elected treasurer.

C. U. Ackerlind has recently taken charge of the steel department of Hamilton & Hansell, Inc., 13 Park Row, New York.

C. D. Miller has been appointed manager of the Buffalo branch sales office of the Burke Electric Co., Erie, Pa. The office is located at 509 Morgan Building. Wilford R. Boyd, formerly Buffalo office manager of this company, is now in the aeronautic service of the Government.

Major David A. Reed, of the law firm of Reed, Smith, Shaw & Beal, Pittsburgh, counsel for the United States Steel Corporation, has joined the American Expeditionary Forces in France.

Lester P. Lane, formerly vice-president and sales manager of the Smiley Steel Co., New York, has severed his connection with that company.

Supply of Steel to Jobbers

Director of Steel Supply Replogle has informed steel makers, under date of July 24, that they can supply steel to jobbers in August in amount up to the average monthly shipments to the jobbers in the first half of 1918. The explanation is that due to a curtailment of shipments in the last 60 days jobbers' stocks in certain lines in some sections of the country have been entirely exhausted and it has therefore been impossible to secure replacement on the basis of July sales. Replacement commencing in September must be made strictly in accordance with the July 3 circular of the Director of Steel Supply.

NEW TRADE PUBLICATIONS

Cranes.—Cleveland Crane & Engineering Co., Wickliffe, Ohio. Bulletin No. 100M. Illustrates and describes a line of cranes in all types and capacities ranging from 1 to 200 tons. The illustrations for the most part are views of actual installations and include electric and hand power traveling and special gantry cranes, electric hoists and ore and coal handling machinery. Illustrations of a number of different trolleys that can be furnished are included.

Stationary Forges.—Buffalo Forge Co., Buffalo. Catalog section No. 198. Devoted to an extensive line of stationary forges. Each unit is given a single page with an illustration, brief description and in some cases tables of the different sizes that can be supplied. In listing the forges, new numbers are given in parenthesis after the new ones and the former are indexed according to both the new and the old numbers.

Condensers and Steam Engines.—Ingersoll-Rand Co., 11 Broadway, New York. Two circulars. The first, No. 876, lists the advantages of employing one of the company's condensing plants in connection with either condensing or non-condensing steam engines. These include a marked reduction in the consumption of fuel, the maintenance of a high vacuum, low operating cost and safety of operation. The other circular, No. 882A, refers to a high-speed piston valve steam engine of the horizontal center-crank type for use where a small self-contained unit is required. A condensed table of specifications and an illustration are presented, together with a brief description of the engine. In both circulars the bulletins giving complete information are referred to.

Push-Button Stations.—General Electric Co., Schenectady, N. Y. Circular No. 68413. Points out the various features of a line of push-button stations for use in magnetic control circuits of all types. These are brought out by a series of panels around an illustration of a typical station with leaders running to the different parts. The several types of station that can be supplied are shown and the special features of some of these styles are mentioned.

Pulverized Coal Feeder and Mixer.—Locomotive Pulverized Fuel Co., 30 Church Street, New York. Bulletin No. 5. Mentions the results obtained with one of the company's combination pulverized fuel feeding and mixing devices in burning Rhode Island graphitic anthracite coal in a finely divided state. The results obtained from this coal in comparison with anthracite from Pennsylvania are presented, and a description of the way in which the tests were run is included.

Special Wood Planing Machines.—National Woodworking Machine Co., Dover, N. H. Bulletin No. 1. Illustrations and descriptive matter explain the operation of a bevel or profile planing machine designed to shape ship materials to varying widths and also develop the proper angle of bevel on the material. The advantages claimed for this machine are a straight passage of the stock through the machine without any side movement or traveling carriage and the elimination of lines, figures or battens on the stock to guide the cutter head.

Steel Bars.—W. J. Crouch Co., Inc., 68 William Street, New York. Bulletin No. 14. Presents a complete word picture of all the processes entering into the manufacture of the commercial steel bar from the time the ore is mined until the finished product emerges from the bar mill. The text is supplemented by illustrations of some of the various stages. Tables of weights and areas are given, and a number of other tables of useful information are included.

Feed Water Heaters.—Ross Heater & Mfg. Co., Inc., Buffalo. Folder. Covers a line of power plant apparatus which includes feed water heaters, surface condensers and expansion joints of crosshead-guided type. Illustrations and brief descriptions of the various units are presented and mention is made of the catalogs in which complete information about each can be secured.

Heat Treating Data.—Brown Instrument Co., Philadelphia. Wall chart measuring $8\frac{1}{2} \times 10\frac{1}{4}$ in. Relates to the melting points of chemical elements and gives a scale of colors associated with various temperatures. A conversion table of Fahrenheit and Centigrade degrees is printed on the back of the chart.

Toolroom Specialties.—Taft-Pierce Mfg. Co., Woonsocket, R. I. Catalog No. 104. Concerned with a line of toolroom specialties which include gages of various types, sine bars and fixtures, V-blocks, parallels, bench plates, universal squares, toolmakers' adjustable knees, etc. All of the different specialties are illustrated and brief descriptions and size tables, where necessary, are presented. Mention is also

made of the facilities possessed by the company for the design and manufacture of special gages, fixtures and tools and the contract production of special machines with interchangeable parts. A number of these special machines which the company manufactured on contracts are shown.

Flexible Steel Armored Conductors.—Sprague Electric Works of General Electric Co., 527 West Thirty-fourth Street, New York. Circular No. B-3466. Deals with a line of steel armored flexible conductors for electric light and power. Among the advantages claimed for the cable are flexibility, ease of installation and protection against the entrance of water.

Ball Bearings.—U. S. Ball Bearing Mfg. Co., Chicago. Loose-leaf booklet. Gives data on an extensive line of ball bearings which includes radial, angular contact and thrust types. In some cases metric as well as English dimensions are given, and tables giving the equivalents in inches of various numbers of millimeters and the decimal and millimeter equivalents of fractions of an inch are included.

Car Dumping Machines.—Wellman-Seaver-Morgan Co., Cleveland. Bulletin No. 9. Concerned with a line of equipment for discharging the contents of open top railroad cars into boats, bins or storage yards by inverting the car side-wise. The equipment shown includes stationary and moving turnover and stationary lifting types. Typical installations are shown with brief descriptions of the capacity of the plants.

Pressure Blowers.—Clarage Fan Co., Kalamazoo, Mich. Catalog No. 22. Treats of a line of blowers of the steel plate type designed to deliver moderate volumes of air against pressure of from 5 to 15 in. water gage. The construction of the blowers is gone into at some length, the text being supplemented by numerous illustrations of complete units and the various parts. Capacity tables and dimension diagrams and tables of the blowers are presented, together with drawings illustrating the various discharge arrangements that can be furnished.

Hand and Trailer Trucks.—Abell-Howe Co., 332 South Michigan Boulevard, Chicago. Booklet. Illustrations and descriptive matter explain the use of interchangeable hand and trailer trucks in industrial plants. The furnishing of a detachable jack tongue and guide wheel enables the truck to be used for transportation around a factory building or between the various units of a plant. A number of views of the truck in use are presented, together with a condensed specification table of the different sizes and styles that can be furnished.

Coke Oven Machinery.—Wellman-Seaver-Morgan Co., Cleveland. Bulletin No. 10. Describes the important features of some types of this company's coke oven machinery. The text is supplemented by illustrations showing an installation at the plant of the Indiana Steel Co., which includes a combined coke pusher, coal leveler and door extractor for use with Koppers by-product ovens. A combination coke pusher and coal leveler for Somet-Solvay ovens, types of door lifters for Koppers ovens and a coal charging larry for by-product coke ovens are also shown.

Grinding and Polishing Machines.—St. Louis Machine Tool Co., 932 Loughborough Avenue, St. Louis. Two circulars. The first illustrates and describes the Western line of grinding machines which are made in 11 different types. Illustrations of the various accessories that can be supplied are presented also. The other circular points out the advantages of the special type of ball bearing used with the company's polishing machines. The different machines making up the complete line are illustrated, and a condensed table of specifications is included. There is practically no text in the circular, reliance being placed upon the illustrations to tell the story.

Clutches.—Hill Clutch Co., Cleveland. June issue of "Hill Clutch Equipment." Mentions an installation of clutches and bearings at the Baker R. & L. Co. for the testing of automobile engines. A description of the equipment employed is presented, supplemented by two illustrations of the engine testing section and others of the bearings and clutches used.

Molding Machines.—Vonnegut Machinery Co., Indianapolis. Bulletin. Describes a motor-driven molding machine for use in woodworking plants. The special feature of the machine is the making of the cutter head integral with the revolving part of the motor, thus eliminating the use of gears or flexible couplings. Views of the machine which is built in two sizes with the various parts indicated supplement the text description.

Nutlock.—Stanley Works, New Britain, Conn. Booklet. Describes a nutlock in which cotter pins, bored bolts or double nuts are not required. The nutlock is designed for use with ordinary bolts or cap screws, and consists of two special washers or a single coned washer with a special recessed nut. Views of the various arrangements for adapting the nutlock to different types of bolts are shown.

Book Review

Bookkeeping and Cost Accounting for Factories. By Dr. William Kent. Pages 258, 8 x 11 in.; numerous illustrations, charts and tables. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York. Price, \$4.

This book was prepared to fill the need for a systematic treatise on cost accounting, giving not only the fundamental theory in accordance with the views of the ablest modern accountants, but also warning against the fallacies of the older school. It is the result of the author's own experience extending over a period of 40 years as a bookkeeper, cost accountant, engineer and manager of works, together with a study of the writings of the best known modern English and American authorities, and conferences with managers and cost accountants of numerous modern factories.

The first three chapters are devoted to bookkeeping, covering the elementary principles involved, the various accounts carried up to and through the monthly column ledger, and finally to a combined journal ledger by means of which the troublesome trial balance is dispensed with. A chapter is then given to a detailed explanation of the Federal Trade Commission's system of accounts for retail merchants, which is criticized as being too involved, and improvements to reduce materially the number of accounts are introduced. Chapter five covers factory accounting. The principles involved in opening a set of factory books are explained and a sample accounting system for a manufacturing concern is given.

After emphasizing the distinction between accounting and cost keeping, the subject of cost accounting is taken up. The author's treatment of this subject is entirely modern in that the accounting department is divorced from the cost department, and this latter determines cost by an independent method. The factory cost of an article in stock is considered to be not what the article costs to produce but what it would cost to reproduce, the figures to be used as a basis for establishing the minimum selling price. Chapters are included covering in detail the subjects of cost finding methods, distribution of burden, depreciation, inventory valuation, appraisals and cost systems. Under the much disputed subject of distribution of burdens, following a comparison of various methods now in use the author explains a method of obtaining a standard burden per unit of finished product. By this method, not only a saving of labor in accounting is effected but a means of obtaining prompt information in regard to the progress of the work through the factory is provided, permitting of a daily check of the number of pieces made, so that any serious variation from the schedule is immediately apparent.

Six chapters are given to modern accounting systems for typical enterprises, such as steel works, foundries, a hardware factory, a machine shop, a wood-working shop, power plants, etc. The final chapter contains examples of reports to stockholders of large corporations, numerous blank forms and a list of books on cost accounting and scientific management.

The book is of value to anyone interested in factory cost accounting and is of special value as a guide in installing systems of cost accounting. It is not intended as an isolated text book on the subjects, as the chapters on bookkeeping are highly condensed and the chapters on factory and cost accounting presuppose a detailed knowledge of accounting.

The question of whether the buying and selling of scrap iron and other metals is an essential war industry has led to a controversy between one of the local draft boards of St. Louis and the District Appeals Board. On the outcome of this controversy hinges the liability for military service of Louis Greenspon, president of Joseph Greenspon's Sons Iron & Steel Co., St. Louis. The facts of this case have been submitted to authorities at Washington for decision.

The Patent Vulcanizing Roofing Co., Albany, N. Y., has drawn plans for a brick and concrete factory building 70 x 245 ft., one-story, to be erected on Tivoli Street, at a cost of \$35,000.

Britain and Germany in Allied Markets

The pre-war positions of Britain and Germany in the markets of countries that are now allied is of special interest. The United States, South American countries and China are not included in the table. The figures are taken from the report of the (British) Engineering Trades After War Committee.

Exports of Machinery (and parts) to France, Russia, Italy, Belgium, Portugal, Serbia, Montenegro, Roumania, and Japan

1912	From Britain £	From Germany £
Rail locomotives	50,225	614,000
Road locomotives	49,384	565,000
Agricultural engines	500,388	47,000
Pumping engines	167,035	238,000
Winding engines	7,509	192,000
Other engines	1,040,930	2,582,000
Electrical machinery	527,315	1,205,000
Agricultural machinery	664,939	1,569,000
Boilers	434,411	185,000
Machine tools	377,729	1,995,000
Mining machinery	53,837	111,000
Sewing machinery	1,067,161	1,155,000
Textile machinery	2,728,785	1,382,000
Typewriters	13,902	135,000
Ship machinery	252,513	.....
Totals	9,676,724	15,578,000

These figures are only roughly comparable. The classifications are different in the two countries, as the report states, but there are other modifying circumstances. Gas, oil and petrol engines are included in other engines, as neither country separately classified them.

Electrolytic Iron for French Crucible Steel

The French Société des Acières et Forges de Firminy, after a careful study of five processes, has adopted at its Rioupéroux works the Burgess process for making electrolytic iron for its own consumption as a substitute for Swedish iron previously used, but now difficult to obtain, in making crucible steel. The estimated costs of a plant for a daily output of 24 tons, or 8640 tons per year of 360 days, and 840 vats of £6 each is £25,640, including buildings. The cost of producing a ton of electrolytic iron, according to Dr. Burgess's own estimate, is about 43s. by his process, but according to M. Aimé Coutagne, the chief engineer at Firminy, this figure has somewhat been underestimated. It is based on a power cost of 1000 kw.-yr. at £10 per kw.-yr.; technical service and administration costs £1400; wages for 20 workmen, £3200; sinking fund, £2000; upkeep and repairs also £2000. As M. Coutagne points out, there is not sufficient allowance made for acid used. On the other hand, power cost is figured too high. Dr. Burgess states that with his process iron 99.97 per cent pure can be produced. The carbon contents of iron made at Rioupéroux varied between 0.015 and 0.064 per cent; silicon between 0.004 and 0.020; phosphorus between 0.002 and 0.009; sulphur between 0.001 and 0.007 per cent; and traces of manganese are to be found. The process employs a feeble current, 100 amps. per sq. met.

Growth of Ganister Industry

The demand for ganister, or quartzite, used in making silica brick, continued its remarkable growth in 1917. According to statistics compiled under the direction of G. F. Loughlin of the U. S. Geological Survey the total quantity of ganister sold in 1917 amounted to 1,295,851 net tons, valued at \$1,350,798, an average price of \$1.04 a ton. This was an increase of 435,895 tons, or about 51 per cent, in quantity, or 155 per cent in value compared with 1916, when the average price was only 62c. a ton. The increase in 1916 over 1915 was 50 per cent in quantity and 58 per cent in value. The marked advance in price in 1917 was due mainly to increased cost of production. Pennsylvania with 26 plants continued to furnish the bulk of the output in 1917—1,003,623 net tons, valued at \$1.11 a ton.

The Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, will shortly begin the erection of a two-story office building 60 x 120 ft. This will include dining rooms, rest rooms, etc., and a large auditorium will be provided on the second floor for use of the men.

NEW ENGLAND STRIKES

General Electric Workers at Lynn Still Out—
Trouble Brewing at Hartford

The big strike of workers at the Lynn, Mass., plant of the General Electric Co., which began July 15, is still unsettled. The development of a riot last Monday morning when an effort was made to resume production, resulting in an exchange of shots between the crowd of about 7000 people at the shop gates and the armed guards of the plant, gives evidence of the bitterness of the controversy. Between 10,000 and 12,000 employees are on strike, only about 1000 workers remaining in the shops last week.

The strikers went out without making any demands. Later they presented these demands:

An eight-hour day; time and a half for overtime up until midnight; double time for overtime after midnight and work on Sundays and holidays; same rate of wages and working conditions as in the Schenectady, N. Y., plant; any existing wages higher than those now paid at Schenectady not to be lowered; reinstatement of all employees now on strike and of those discharged within the last three weeks, without loss of seniority or bonuses and without discrimination; revision of the records of any persons dismissed during the last two years for activity in organized labor; abolition of physical examinations; the Schenectady plan of dealing with grievances; virtual recognition of the unions; and the guarantee of no discrimination against trades unions.

Lengthy statements from both sides have appeared in the local press and long telegrams have been sent to President Wilson by the leaders of the strikers and by Walter C. Fish, general manager, setting forth the claims and charges of the strikers and the management. Two, at least, of the many points at issue, seem to be regarded as vital—abolition of compulsory physical examinations and recognition of the unions and their committees.

A public hearing before the State Board of Conciliation and Arbitration was held July 25, at which Henry J. Skellington was present as conciliator appointed by Secretary of Labor Wilson. Most of the testimony offered was on the subject of discrimination and discharges because of alleged union activities and virtually no progress was made on the settlement of the strike.

The strikers have offered to submit the entire matter to the National War Labor Board; but the management of the plant has demanded that the men recognize the principles of the board and return to work before the board is called into the matter. Most of the strikers were unorganized before the strike was called, but it is now reported that about 8000 have joined the various craft unions.

A committee of strikers visited Secretary of Labor Wilson at Washington last Monday morning to lay the grievances of the strikers before him. They were attended by committees from the Schenectady and Pittsfield plants of the General Electric Co. The National War Labor Board now has under consideration wage adjustments and shop conditions in these two plants.

Demands at Hartford

It is announced by Organizer George A. Doyle, Hartford, Conn., that the machinists' union will demand from the Colt's Patent Fire Arms Mfg. Co., Hartford, an increase of pay of 25 per cent and the abolition of the present bonus. This would mean a net increase of about 12½ per cent. The demands also include an 8-hr. day in place of the present 9-hr. day, and also time and one-half for overtime in place of time and one-quarter as now paid. Two weeks ago the Pratt & Whitney Co. went on the 8-hr. day, the first shop in Hartford to do so. According to Mr. Doyle, it has been decided to ask the National War Labor Board to consider the Colt matter. On July 18 a committee of workmen called on B. M. W. Hanson, vice-president, with the demand for the 8-hr. day and the demand was refused.

STEEL CORPORATION EARNINGS

Large Allowance for War Taxes—Extra Dividend on Common Declared

The report of the United States Steel Corporation for the second quarter of the year 1918 shows net earnings of \$62,557,391 compared with \$56,961,424 in the preceding quarter. The earnings are very large and show marked regularity for April, May and June. The allowance for taxes amounts to the immense sum of \$90,716,250, which is \$58,716,250 for the current quarter, on the basis of existing tax laws, and the remainder for account of additional taxes which may be chargeable for six months under proposed legislation. The regular quarterly dividend of 1¼ per cent on preferred was declared, as was an extra dividend of 3 per cent on the common, the same as in the five preceding quarters. The earnings for the past three years and for the first two quarters of the present year have been as follows:

Quarters	1918	1917	1916	1915
First	\$56,961,424	\$113,121,018	\$60,713,624	\$12,457,809
Second	62,557,391	90,579,204	81,126,048	27,950,055
Third	.....	68,243,784	85,817,067	38,710,644
Fourth	.....	59,724,125	105,968,347	51,232,788

Without making an allowance for the war taxes and interest on subsidiary companies' bonds, the earnings of the Steel Corporation for the past six quarters have been as follows:

First quarter, 1917.....	\$113,121,018
Second quarter	144,498,076
Third quarter	131,976,797
Fourth quarter	120,674,489
First quarter, 1918.....	88,546,622
Second quarter	153,273,641

Statement of United States Steel Corporation and Subsidiary
Companies for the Quarter ending June 30, 1918

	Earnings before charging interest on the subsidiary companies' bonds outstanding	Less: Interest on the subsidiary companies' bonds outstanding	Balance of earnings
April, 1918.....	\$21,384,051	\$739,069	\$20,644,982
May, 1918.....	22,256,406	762,202	21,494,204
June, 1918.....	21,181,064	762,859	20,418,205
	\$64,821,521	\$2,264,130	

Total earnings after deducting all expenses incident to operations, comprising those for ordinary repairs and maintenance of plants, allowances for estimated proportion of extraordinary cost of facilities installed by reason of war requirements and conditions, also taxes (including \$90,716,250* for account of Federal income and war excess profits taxes), and interest on bonds of the subsidiary companies.....\$62,557,391

Less, charges and allowances for depreciation, applied as follows:

To depreciation and extraordinary replacement funds and sinking funds on bonds of subsidiary companies	\$8,277,311
To sinking funds on United States Steel Corporation bonds	1,880,597
	10,157,908

Net income	\$52,399,483
Deduct: Interest for the quarter on United States Steel Corporation bonds outstanding.....	\$5,236,083
Premium on bonds redeemed.....	238,250
	5,474,333

Balance	\$46,925,150
Dividends on stocks of the United States Steel Corporation:†	
Preferred, 1¼ per cent.....	\$6,304,919
Common, 1¼ per cent.....	6,353,781
	\$12,658,700
Extra dividend:	
Common, 3 per cent.....	15,249,075
	27,907,775

Balance of Surplus for the quarter.....\$19,017,375

*This allowance for taxes includes \$58,716,250 for the current quarter on basis of existing tax laws, and \$32,000,000 for account of additional taxes which may be chargeable for first six months under proposed legislation.

†Dividends Payable: Preferred, Aug. 30, 1918; books close Aug. 5, open Aug. 7. Common, Sept. 23, 1918; books close Aug. 30, open Sept. 4.

The Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., has awarded to the Semet-Solvay Co. of Syracuse, N. Y., the contract for constructing the coke plant of 120 ovens to be built in the Birmingham district. This plant is expected to be completed by September, 1919, and will supply the Government with coke by-products.

Change in Dimension of Heat-Treated Bars

Peculiar Behavior of Plain Carbon and Alloy Forged Bars Quenched or Annealed Under the Same Conditions

THE accident reports issued by the Interstate Commerce Commission on the failure of steel rails and other railroad material have furnished data upon the physics of materials which are of interest beyond their immediate application to the derailments in which the material was involved. Some tests in progress pertaining to railroad accidents under investigation are developing features of peculiar interest.

Under the direction of H. W. Belnap, former chief of the Bureau of Safety, James E. Howard, engineer-physicist of the commission, is conducting some investigative work on the phases through which steel passes from its primitive state in the ingot, rolled or finished shape until rupture ensues. This field of inquiry is a vital one when considering the safety of railroad and other engineering structures, upon which the usual primitive tests of acceptance furnish meager information, if indeed the original properties are sufficiently understood to enable judgment to be formed upon the endurance of the material under service conditions.

These investigations have been directed to the definition of observable changes in properties of steels, which would serve as an index of their safe use or, by the elimination or reversal of the effects of service conditions, throw light upon antecedent conditions which were unknown. Railroad material passes through many vicissitudes which do not admit of being followed in the track but which have an important influence on the life and integrity of the material. It is obvious that investigative work of this kind must assume a very wide scope, embracing features which do not usually form a part of the tests of materials.

The accident reports issued by the Interstate Commerce Commission have shown the presence of internal cooling strains in steel rails, acquired during the process of manufacture, and how those strains are augmented by the cold rolling of the wheels on the heads of the rails after they are put into the track. These internal strains may be effaced by a subsequent annealing of the metal.

In addition to effacing the internal strains of tension and compression respectively, the rails change their dimensions, shortening in length. Suc-

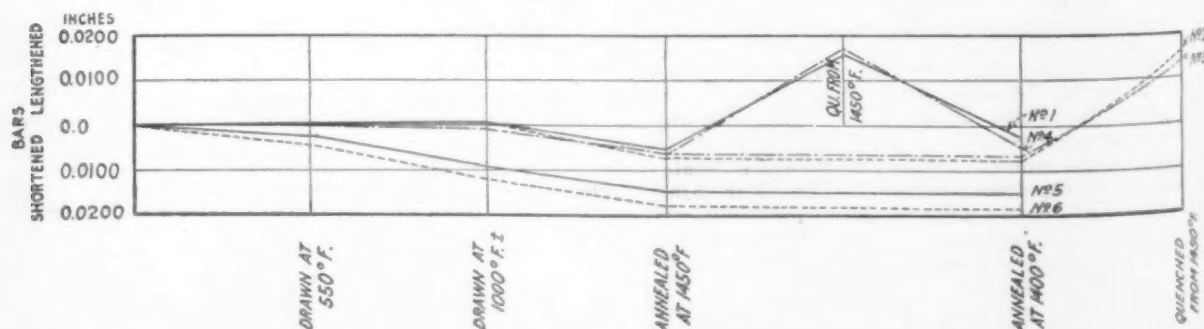
cessive annealings have shown such a degree of shortening that a full length 33-ft. rail would have a final length of 32 ft. 10.8 in.; that is, 1.2 in. less than its original length.

Pursuing this inquiry with some forged bars of rail steel finished at different temperatures and some quenched in different mediums, results were reached which appear in Fig. 1. In respect to their behavior after exposure to low, drawing temperatures these bars resolved themselves into two groups. Those which were forged at different temperatures and allowed to cool naturally in the air and the bar which was cooled by means of an air blast did not change in length materially after heating to 550 and 1000 deg. Fahr. respectively. The bars which were quenched in oil and in water from forging heat, on the other hand, contracted in length after exposure to each of these temperatures. In this connection it will be noted that a change in length of these two bars occurred at such temperatures as to dissociate the effect from any relation to the recalcence periods. Each of the bars of both groups were materially shortened after annealing at 1450 deg. Fahr. Reheating and quenching and reannealing lengthened and shortened the bars.

Accompanying these tests, observations were made on the behavior of two 4½-in. cubes which were drawn down from a 7½-in. bloom, the reduction being done under a forging press. Gaged lengths were established on each of the six sides of the cubes, 28 in all, on which the changes in dimensions were observed. One of the cubes was annealed at 1450 deg. Fahr. It shortened in length in the direction it had been forged several times as much as in girth dimensions, according to measurements taken along the middle of the faces. Along the corners the changes in dimensions were less pronounced than along the middle of the faces. Quenching in water or oil from 1450 deg. Fahr. in general resulted in a considerable increase in the gaged lengths, some, however, showing negative results.

Effects attending the brief period during which immersion in the quenching mediums took place appeared responsible for final changes in dimensions, most of which were positive but some had negative signs. Not only were the results influ-

Fig. 1—Annealing and Quenching Tests of 1-In. Square Forged Steel Bars. Bars finished at different temperatures, cooled in different mediums



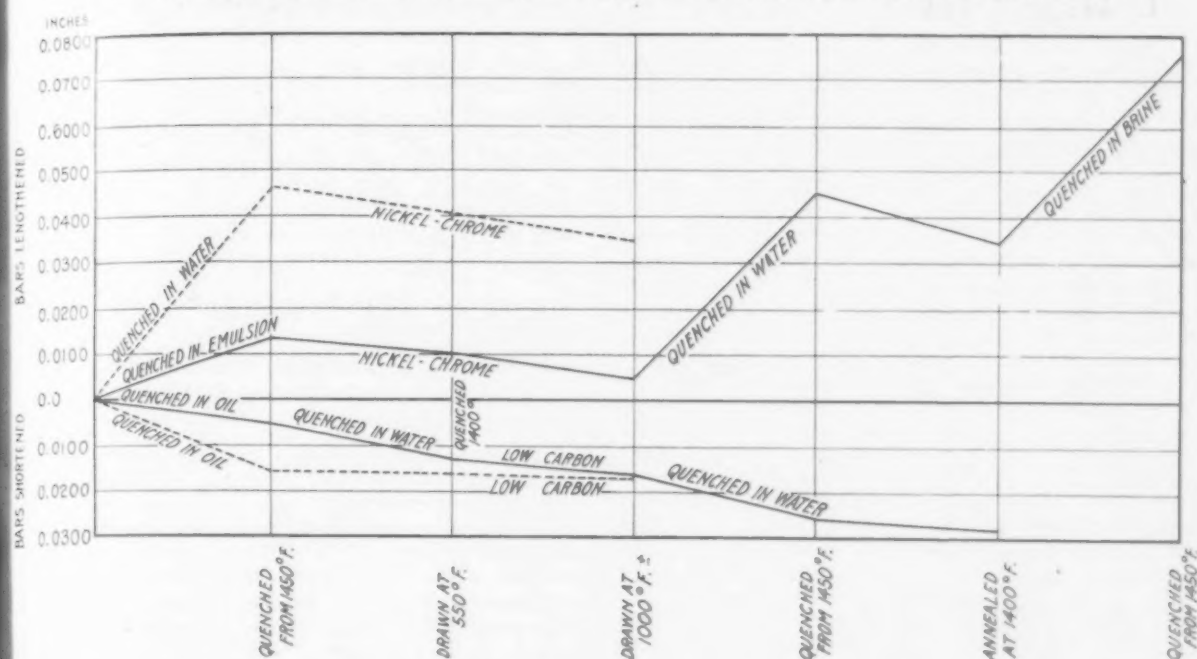
Changes in Dimensions Measured in Gaged Lengths of 10 In. Each

No. 1. High finishing temperature
No. 2. Low finishing temperature
No. 3. Finished nearly black hot

No. 4. Hot forged, cooled with air blast
No. 5. Hot forged, quenched in oil
No. 6. Hot forged, quenched in water

Composition, rail steel: Carbon, 0.637; manganese, 0.67; phosphorus, 0.021; sulphur, 0.080; silicon, 0.095; nickel, 0.67. and chromium, 0.35 per cent

Fig. 2—Quenching and Annealing Tests of 1½-In. Forged Bars of Nickel-Chrome and Low Carbon Steel



Changes in Dimensions Measured in Gaged Lengths of 10 In. Each

Composition of nickel-chrome bars above zero line: Carbon, 0.43; manganese, 0.35; phosphorus, 0.030; sulphur, 0.014; silicon, 0.10; chromium, 0.88 and nickel, 1.92 per cent.

Composition of low carbon bars: Carbon, 0.27; manganese, 0.34; phosphorus, 0.028; sulphur, 0.015; silicon, 0.10, and chromium and nickel, none.

enced by the manner of immersing in the quenching mediums but it was also thought that other examples in this series of tests showed effects attributable to forging conditions, possibly attaching to the chilling effect on the faces of the forged bars by resting upon the cooler face of the anvil.

It is not known what influence, if any, these differences have on local conditions affecting the integrity of the metal under subsequent exposure to strains and stresses in service but they represent measurable differences in behavior and constitute a class of data upon which a very limited amount of exact information is available.

These observations were extended to two grades of steel furnished by Paul M. McKinney, chief chemist, Washington Navy Yard, upon which some of the results are shown in Fig. 2. Paradoxically, it appears that steel of one composition when heated and quenched lengthens while steel of another composition shortens in the length of the forged bars. Furthermore, that successive heatings and quenchings of the one composition resulted in continued increase in length while the same treatment

of the other composition resulted in continued decrease in length. Each steel responded to annealing in the same direction, that is, each was shortened in length.

Each steel was said to have been forged down into 1½-in. bars in accordance with usual forging practise, and so far as known such was the case. The tests were repeated on each grade of steel with confirmatory results.

As the matter now stands the results appear very perplexing. Whatever explanation may attach to antecedent conditions not at present known, some steel bars are here presented which persistently displayed opposite results when repeatedly quenched and similar results when annealed.

THE IRON AGE is indebted to Mr. Howard for advance information upon these peculiar and interesting phenomena. It is to be hoped he will continue his observations, either to clear up the mystery which surrounds the primitive states of these two groups of bars which behaved so differently, or establish the relation which the chemical composition bears to their behavior.

Manganese Ore from British Columbia

Shipments of manganese ore have begun from the deposits 6½ miles from Kaslo, British Columbia, on the Kaslo and Nakusp branch of the Canadian Pacific Railway. It is apparently a surface deposit covered by from 6 in. to 2 or 3 ft. of earth. The output is about 25 tons per day and is being shipped to the United States. There appears to be a considerable body of ore, estimates varying all the way from 2500 tons to 12,000 or 15,000 tons. The assay of the first car shipped follows: Moisture, 25.33 per cent; manganese, 39.65 per cent; iron, 4.40 per cent; silica, 10.98 per cent; phosphorus, 0.0074 per cent.

James J. Barrett, federal labor conciliator, has arrived in Madison, Wis., to investigate difficulties existing between employers and the machinists' union, which is demanding a wage of 72½c. per hr. The men are remaining at work pending an adjustment of the matter.

High Rate of Coal and Coke Output

Production of bituminous coal in the United States in the week ended July 20 was not equal to that of the record week of July 13, which was greater than in any preceding week. The estimate of the U. S. Geological Survey is 12,950,000 net tons, as against 13,273,000 tons in the preceding week and 11,230,000 tons in the corresponding week of 1917. The production of beehive coke in the week of July 20 was 668,188 net tons as against 680,285 net tons in the preceding week. The principal coke operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania reported production for the week of July 20 at 393,929 net tons and the operation of the plants at 76.6 per cent of capacity as against 77.2 per cent in the preceding week. By-product coke production was 517,671 net tons against 506,451 tons in the preceding week. By-product plants were operated at 91.2 per cent of their present capacity as against 89.8 per cent during the week of July 13.

To Save Wagon and Truck Steel

WASHINGTON, July 30.—In its campaign to cut down the unnecessary use of steel, the Conservation Division of the War Industries Board has called upon the manufacturers of farm wagons and trucks to reduce greatly the varieties of their product, for the purpose of conserving steel and iron and reducing the amount of capital tied up in manufacturers' and dealers' stocks. A schedule of such reductions and new standardizations, to become effective at once unless other economies can be effected by additional changes, has been sent to manufacturers. Five classes are established—farm wagons and gears; valley wagons and gears; mountain wagons and gears; one-horse wagons and gears, and farm trucks and gears—all these vehicles to have a standard track of 56 in. measured from center to center of tire on ground, and a standard width of 38 in. between stakes. All tires are to be oval edge, eliminating both round and square edge types. Wagon boxes are to be of the uniform width of 38 in. without footboards. Farm wagons are to be restricted to four capacities—light, 1500 lb.; medium, 3000 lb.; standard, 4500 lb., and heavy, 6000 lb. Only one gear, with but one height of bolster, is to be made for each capacity. Valley wagons and gears are to be in three capacities and mountain wagons and gears in four capacities. Farm truck gears are to be manufactured in but one size of cast skein, viz., 3¼ in.

Portions of the new schedule governing tire assortments, wheel diameters, etc., are to become effective not later than Jan. 1, 1920; and no equipment that differs therefrom is to be manufactured after that date except for repair purposes. All other portions of the schedule are to become effective not later than Jan. 1, 1919, and no equipment that differs therefrom is to be manufactured after that date except for repair purposes.

Decline in British Tin Plate Output

The normal productive capacity of tin, terne and black plates in the United Kingdom is estimated at about 1,000,000 tons per year, over 80 per cent of the mills being located within 20 miles of Swansea. In 1913 the United States produced approximately 823,000 tons of tin plates; 1914, 931,000 tons; 1915, 1,080,000 tons; 1916, 1,204,500 tons; and in 1917 the total production probably exceeded 1,600,000 tons. Since 1913 the production in the United Kingdom has steadily decreased while that of the United States has shown a remarkable increase. Soon after the outbreak of war in 1914 the British authorities found it necessary to restrict the amount of steel to be used for the manufacture of tin plates for the reason that tin plates were not primarily needed for war purposes and large quantities of steel were essential for the manufacture of munitions of war. Exports of tin plates were prohibited except on license. Steel could be used or manufactured for tin plates only on a government order, and finally in 1917 all domestic sales of tin plates were prohibited except with a government permit. These restrictions resulted in the closing of a large number of tin plate mills.

The Warner Gear Co., Muncie, Ind., has placed a contract with the Austin Co., Cleveland, for three factory buildings, one 247 x 240 ft., one story, another a two-story building 100 x 192 ft., the second floor being 60 x 90 ft., and a boiler house 60 x 140 ft. Other contracts taken by this company during the past few days include the following: Building 120 x 140 ft. for the General Chemical Co., New York, at Hegewich, Ill.; one building 60 x 120 ft., and another 40 x 40 ft. for the Franklin Baker Co., New York; a 10-stall roundhouse at Nelsonville, Ohio, for the Hocking Valley Railroad; a building 90 x 280 ft. for the E. M. Eddy Foundry Co., Chicago; a building 80 x 200 ft. for the Baldwin Locomotive Works, Philadelphia; a building 100 x 120 ft. for the Williamsport Wire Rope Co., Williamsport, Pa., and a building 60 x 208 ft. for the Manhattan Rubber Co., Passaic, N. J.

How to Treat High-Speed Steel

The metallurgical treatment of high-speed steel was recently discussed by J. L. Thorne before the Steel Treating Research Society of Detroit. He warned the purchaser against buying steels by trade name only, since there have been instances where the composition has been materially changed without notice to the user. The high-speed steels on the market now are comprised within the following limits, the last column giving a good chemical specification:

	Range Per Cent	Proposed Per Cent
Carbon	0.47 to 0.91	0.85
Silicon	0.12 to 5.00	0.12
Manganese	0.12 to 0.67	0.25
Sulphur	0.008 to 0.057	0.02
Phosphorus	0.006 to 0.051	0.02
Chromium	1.50 to 5.52	2.50
Vanadium	0.13 to 2.50	1.00
Tungsten	11.74 to 22.27	18.00

As the steel is purchased it is sampled and analyzed. Close adherence to chemical specification is impossible, and undesirable sulphur and phosphorus should be kept low; manganese as low as necessary to insure against harmful sulphur effects, and silicon low to prevent brittle silicide segregations. The tungsten-chromium-carbon combination is, of course, responsible for the "red-hardness"; while vanadium, originally added merely as a scavenger, increases the elastic limit and the resistance to wear and shock. New high-speed stock should have a hardness slightly under Brinell 250 or scleroscope 35 in order that it may be machined readily. Microscopic examination is also undertaken before the material is accepted, looking particularly for forging cracks, surface decarbonization, uniform structure, segregation and ingotism.

After the tool has been formed and sent to the hardening room it should first be given a "soaking" heat at from 1500 to 1800 deg. Fahr to avoid expansion strains and cracks, if suddenly put into the high hardening heat. When uniformly heated it is transferred to a high-temperature furnace, whose heat is as uniform as possible, controlled with standardized pyrometers and allowed to remain there a certain specified time. This time is automatically registered by colored lights and warning buzzers, so that at the proper instant the tool can be removed and quenched, preferably in oil circulated over cooling coils to maintain a uniformly low temperature. Taylor discovered that to get the maximum red-hardness this quenching temperature must be far above the critical temperature, approaching that where the tool actually softens. The hardened tool is then "drawn" in a low-temperature furnace, bearing in mind that the metal progressively softens up to a point lying between 700 and 800 deg. Fahr., from which to about 1100 deg. it increases in hardness with the temperature.

In extensive tests of nearly a thousand drills made of all available domestic and foreign high-speed steels, it was discovered that the most efficient tools exhibit a great resemblance in microscopic structure, regardless of their manufacture or heat treatment. This has led to the adoption of the so-called "standard structure," to be looked for in experimenting to discover the proper heat treatment to give a new lot of metal. Start with several samples, and subject them to various temperatures for various times approximating the expected conditions. A microscopic examination will then show the one which nearest approaches the standard structure. As the temperature and time of this piece is known, proceed to another set treated at temperatures and times slightly above and below the first approximation. In this way the third series will give the exact heat treatment which will produce the desired structure. Finished tools are then run on an experimental drill press, their work compared with that done by one of a set of control tools, and reported as so much plus or minus standard.

The Ohio Iron & Steel Co., which sold the Mary furnace at Lowellville, Ohio, to the Sharon Steel Hoop Co. last February, announces the removal of its office to the Stambaugh Building, Youngstown, Ohio.

Machinery Markets and News of the Works

EFFECTS OF BARRED ZONE

Mid-West Shows Increasing Activity

Record-Breaking Crane Business in Prospect— Large-Lot Machine-Tool Inquiry Slackens

The general trend of machine-tool and crane inquiry indicates that the recent Government decree establishing the barred industrial zone in the East has in general caused a falling off of new round-lot requirements in that section, except for some gun plant developments. The Middle West, conversely, shows in most centers increased activity in both inquiry and sales. Distributors in Chicago are working under high pressure, and the month's sales constitute a record for some, although for the most part orders are confined to small lots. War business in metal-working is permeating the entire territory thereabouts. All machine-tool manufacturing centers report an increase in the pressure put upon them for new equipment. Notable lists are not many, but the aggregate of demand is large. The lighter and smaller types of tools are in good demand on account of the quick delivery obtainable.

Gunmakers are the present buyers of large lots. In Cincinnati they have practically duplicated their orders. Munition plants in southern Connecticut are also reported active in the market.

New York

NEW YORK, July 30.

The drop in machine-tool inquiry, noted last week, has, if anything, been accentuated the past few days. Replacement orders are still in good volume, but even they are not up to the recent level. By contrast, too, with the equipment purchases of the Wright-Martin Aircraft Corporation, which are said to aggregate in the neighborhood of \$2,000,000, other business is somewhat dwarfed. The contract booked from the Wright-Martin list in the case of several machine-tool builders represented the largest single order ever taken by them, this with some covering a business career of many years. The Wright-Martin company is now rounding out its shop equipment by the purchase of miscellaneous special tools and accessories.

Much business is still pending. The Otis Elevator Co. is expected to close this week on its list of about 165 tools for making recuperators for gun recoil mechanism at its Yonkers plant. It has already bought several lathes for repair work at its New York factory. The Vulcan Iron Works, Jersey City, N. J., is about to place orders for 12 tools, including a plate bender, a plate planer, punches, shears, etc. The Staten Island Shipbuilding Co., 1 Broadway, New York, bought two large punches to round out its shop. Equipment for the Iroquois Works of the Barber Asphalt Paving Co., at Buffalo, N. Y., includes six large plate planers. The Bethlehem Shipbuilding Corporation is in the market for four more rivet-making machines in addition to the four forging tools bought for its Alameda works. Scattered inquiry for forging machinery bulks rather large, much of this business originating in eastern Pennsylvania.

Immediate interest in crane orders centers around the placing of these requirements for the 16-in. howitzer plant of the Midvale Steel & Ordnance Co., at Nicetown, Philadelphia, which are expected to be let at once and will, on account of the heavy construction specified, presumably go to two mid-West builders of this type of cranes. The list calls for one 100-ton, six 60-ton, two 50-ton, nine 30-ton, eight 10-ton, one 10-ton jib and one 5-ton billet-handling cranes. Both the Sun Shipbuilding Co., Chester, Pa., and the Barber Asphalt

The list of machines for the 16-in. howitzer plant of the Midvale Steel & Ordnance Co., Nicetown, Philadelphia, is reported to contain between 300 and 400 tools. The Otis Elevator Co., New York, has not closed as yet for its 165 tools for making recuperators at its Yonkers, N. Y., plant.

The amount of crane business outstanding is large. The list for the Neville Island plant of the Ordnance Department, United States Steel Corporation, amounting to between \$2,000,000 and \$3,000,000, is still unclosed. Those for the Midvale Steel & Ordnance Co.'s 16-in. howitzer plant, 104 totaling about \$1,000,000, have not yet been placed. The Sun Shipbuilding Co., Chester, Pa., and the Barber Asphalt Paving Co., Philadelphia, have not yet completed the purchase of the 34 cranes for their new marine boiler plants. The Newport News Shipbuilding & Dry Dock Co., Newport News, Va., has put out a revised list for 15 cranes for its boiler plant at Richmond, Va., and the Bethlehem Shipbuilding Corporation, Bethlehem, Pa., is in the market for six more special cranes for its Alameda works.

Locomotive crane builders, virtually engaged exclusively on Government work, are expecting an early announcement of the Government's requirements for 1919.

Railroad buying has apparently been pared down to upkeep needs, there being no present indication of the inauguration of large scale buying under Government auspices.

Paving Co., Philadelphia, are about to close for cranes for their new marine boiler plants. The latter specifies one 100-ton, two 35-ton, two 25-ton and ten 15-ton units. A supplementary list put out by the Bethlehem Shipbuilding Corporation for its Alameda works is for six 5-ton double-cantilever cranes, 168 ft. overall, also for one 6-ton bridge type, 21-ft. 1-in. span, and two 5-ton bridge type, 27-ft. 1-in. span, for existing runways. A 5-ton 19-ft. span and a 10-ton 32-ft. span have been ordered for the Sparrows Point plant. The Newport News Shipbuilding & Dry Dock Co., Newport News, Va., has issued a revised crane list, cutting the original from 29 down to 15 and eliminating its proposed engine building requirements. The amended list is solely for the boiler shop at Richmond, Va., and covers two 70-ton 80-ft. span with two 35-ton trolleys and 10-ton auxiliaries, four 30-ton 80-ft. span, two 30-ton 30-ft. span and six 10-ton 40-ft. span. The Federal Shipbuilding Co. has placed orders for two more cranes for its Kearny, N. J., yard. The Consolidated Rolling Mills & Foundries Co., New York, has bought a 5-ton crane for export. Buying is still being done on the lists for the Cumberland, Md., and Glenwood, Pa., shops of the Baltimore & Ohio Railroad by Westinghouse Church Kerr & Co., Inc., the engineer. The Tacony Steel Co., Tacony, Philadelphia, is in the market for a 15 to 20-ton three-motor crane. A 20-ton three-motor 40-ft. span crane is wanted by the New York Engineering Co., 2 Rector Street, New York.

Locomotive crane builders are now doing about 95 per cent Government work. One leading manufacturer is booked up to November. Nearly all inquiry is for early delivery and most buyers are therefore compelled to seek priorities from the crane section of the War Industries Board. The trade is now looking forward to the announcement of the Government's locomotive crane needs for 1919, publication of which is expected before long.

Some dealers, both in machine tools, cranes and shop accessories, incline to the view that the falling-off in inquiry locally is attributable to the shift in plant development into the Middle West as a result of the barred industrial zone created in this section and New England by the Government decree. A rather rapid increase in sales in mid-West territory is cited to confirm this.

Railroads have apparently had their plans for buying shop equipment pared down to the bare necessities for upkeep, and machinery dealers are inclined to the view that anticipations of large orders from this source were premature.

The Galvanized Products Co., East Stroudsburg, Pa., is in the market for a $\frac{3}{4}$ to 1-in. open die heading, upsetting and forging machine and a $\frac{3}{4}$ -in. bolt holder.

The Public Service Commission for the First District, New York, has granted the Interborough Rapid Transit Co., 165 Broadway, New York, permission to issue notes to the total amount of \$39,416,000, carrying 7 per cent and maturing July 1, 1921, for improvements and extensions in its power plants, new electrical machinery, additional tracks and other work. Deducting \$1,773,720 to be allowed as expense of sale, the appropriation, totaling \$37,642,280, is to be expended as follows: Equipment of new subways, including improvement and reconstruction of existing electric power houses, substations or other electrical equipment, \$20,229,762; for plant and structure and for equipment for extension of elevated lines, \$3,250,131; for improvements and reconstruction in electric power houses, substations, transmission lines, etc., for operation of extensions, \$2,391,000.

The Houpert Machine Co., 351 West Fifty-second Street, New York, will occupy the plant now being erected by the Interstate Land Holding Co., Boston, at Harris Avenue and Marion Place, Long Island City, at a cost of \$75,000.

The Hurlburt Motor Truck Co., Third Avenue and Harlem River, New York, is planning to enlarge its plant. It recently received a contract from the Government for class B army motor trucks.

The Bureau of Yards and Docks, Navy Department, Washington, is having plans prepared for extensions and improvements to the electric power plant at the Navy Yard, Brooklyn. An appropriation of \$750,000 has been granted for the work.

The Standard Shipbuilding Corporation, 44 Whitehall Street, New York, has acquired under lease the Birch Point Shipyard, Wiscasset, Me., and will use it for the construction of six vessels. The yard has three ways.

The Government is planning for the construction of an addition to its machine shop at Tompkinsville, S. I., to cost about \$30,000. Joseph T. Yates, lighthouse inspector, is in charge.

The Barber Jewelry Mfg. Co., 36 Gold Street, New York, has increased its capital from \$20,000 to \$60,000.

A one-story reinforced-concrete factory, 200 x 340 ft. will be erected by the Realty Associates, 162 Remsen Street, Brooklyn, on Second Avenue, near Forty-first Street, South Brooklyn, to be occupied by companies now located in the Bush Terminal, which is to be vacated for Government use on Dec. 1. The Turner Construction Co., 242 Madison Avenue, New York, is the contractor.

The Standard Aircraft Corporation, 233 Broadway, New York, with works on Brunswick Avenue, Elizabeth, N. J., has increased its capital from \$5,000,000 to \$10,000,000.

Robert C. Lafferty, Inc., New York, has been incorporated with a capital of \$100,000 to manufacture bronze memorials and other bronze and metal specialties. Robert C. Lafferty, 3135 Broadway, and others, are the incorporators.

The National Bridge Works, Review Avenue, Long Island City, has had plans prepared for a one-story addition, 83 x 135 ft., to cost \$20,000. It will be used as a shear works extension.

The Cameron Machine Co., 61 Poplar Street, Brooklyn, has acquired property at 13 Hicks Street for a consideration of \$13,000. It is understood the site will be used for extensions.

The Loyal Machine Tool Co., New York, has been incorporated with a capital of \$10,000 by J. Karalan, O. Zuber and A. A. Spyvand, 4205 Fifteenth Avenue, Brooklyn, to manufacture tools, etc.

The M. J. Ford Mfg. Co. of New Jersey, Jersey City, N. J., has been incorporated with a capital of \$50,000 to manufacture tools, etc. Jacob Kushner, John Tyler and A. J. Morrell, Paterson, are the incorporators.

The Metal & Thermit Corporation, Cornelson Avenue, Jersey City, N. J., will build a one-story brick and steel machine shop on Bishop Street to cost \$17,000.

The Federal Shipbuilding Co., Kearny, N. J., will use the property recently acquired in the vicinity of its works on the Hackensack River for the construction of a new drydock, shop erection buildings and auxiliary works. The estimated cost of the new works is reported at over \$8,000,000.

Buffalo

BUFFALO, July 29.

The Atlas Steel Casting Co., 1963 Elmwood Avenue, Buffalo, has filed plans for a one-story machine shop and pattern works, 60 x 200 ft., to cost \$21,200. The company has also taken out a permit to build a one-story shell inspection department, 72 $\frac{1}{2}$ x 96 ft.

The Stratten Engineering Laboratories, Buffalo, have been incorporated with a capital of \$10,000 by J. E. Barry, F. G. Hansel and C. N. Oatman to manufacture aircraft motors, etc.

The Delaney Forge & Iron Co., 300 Perry Street, Buffalo, has had plans prepared for a machine shop and forge works, of brick and concrete, 100 x 250 ft., and 120 x 300 ft., respectively.

The Buffalo Dry Dock Co., Buffalo, has had plans prepared for a one-story shop extension at its shipbuilding plant, 225 Ganson Street, 70 x 150 ft., to cost \$25,000.

The new boiler shop to be constructed by the Barber Asphalt Paving Co., Buffalo, at its Iroquois Works on Walden Avenue, will be 48 x 195 ft. and 30 x 125 ft., and cost about \$50,000.

Revised plans have been prepared by the Bridgeford Machine Tool Works, Winton Road North, Rochester, N. Y., manufacturer of lathes, etc., for the proposed addition to its plant. It will consist of a one and two-story building, 155 x 275 ft.

The Rochester Auto Parts Co., Culver Road, Rochester, N. Y., will build a one-story extension, 50 x 100 ft., to cost \$5,000.

The Half Moon Light, Heat & Power Co., Mechanicsville, N. Y., has increased its capital from \$150,000 to \$200,000 for extensions in its power plant and system.

The Paige Metal Products Co., Rochester, N. Y., is considering the erection of a plant at Clyde, N. Y., for the manufacture of aluminum specialties.

J. B. Wise, Inc., Mill and Moulton streets, Watertown, N. Y., manufacturer of brass plumbing goods, is considering the construction of a two-story and basement addition, 43 x 65 ft., to cost \$60,000.

A one-story pumping plant to cost about \$35,000 will be erected by the Borough Council, Westfield, N. Y.

The Onondaga Steel Co., Syracuse, N. Y., has plans under way for four additional buildings on its 12-acre plant site at Eastwood. Actual construction may not be started until after the war. Office, warehouse, annealing and melting facilities are planned. A rolling mill and hammer shop, 100 x 140 ft., together with a boiler house, have just been completed and will be used temporarily to house the other departments. Samuel S. Buckley is president.

The Kellogg Structural Steel Co., Buffalo, will build an addition to its fabricating shop at Stone Street and the New York Central Railroad, to cost \$12,000.

The General Drop Forge Co., Buffalo, C. E. Littell, manager, 55 Carroll Street, has let to the John W. Cowper Co., Inc., contract for an addition.

The Buffalo Dry Dock Co., Ganson Street and the Buffalo River, Buffalo, will build a machine shop, 72 x 150 ft., to cost \$27,000.

The Lake Erie Boiler Works, Perry and Chicago streets, Buffalo, will build an addition to its plant to cost \$14,000.

New England

Boston, July 27.

A general increase in the production of New England machine-tool and small tool factories is to be seen, even though there is a scarcity of labor and materials and some other difficulties to be overcome. The endeavor to increase production is seen in the good business that is being done by the machinery jobbers in this section. They report a steady increase in the demand for machine tools of all kinds, coming almost entirely from factories that are engaged in the production of war materials. Notable lists are rarely heard of these days, although some of the munitions plants in southern Connecticut are reported to be making inquiries for large lists of equipment in the New York market. Little of such equipment is being furnished by local distributors, but many of the machine-tool builders will participate in these orders when they are definitely placed. Several machine tool plants are not seeking heavy business for their own lines, as they are heavily engaged in sub-contracts for the arsenals and other munitions plants and do not know how to increase their working forces.

The restriction placed upon plant expansion in this section is being reflected sharply in the construction news of the day as new ventures or new manufacturing projects of any size are infrequent. The labor situation causes much in-

quietude as strikes, demands and threats of strikes still fill the news columns of the daily press. It is thought that the decision in the Bridgeport wage case will help to stabilize conditions, as at least one Springfield wage adjustment is being deferred definitely for the Bridgeport award and that award will probably affect the labor situation in other places. Efforts at conciliation bear promise of restoring production in plants now having labor troubles, and in cases where the men have returned to work pending adjustment by official agencies no further outbreak is anticipated.

The Old Colony Foundry Co., East Bridgewater, Mass., has been incorporated with authorized capital stock of \$100,000. Richard W. Nutter is president and Charles L. Nutter, treasurer.

The Anderson Sheet Metal Co., Providence, R. I., has been incorporated with authorized capital stock of \$100,000 by John Hyslop, Providence, and Alexander Anderson, William McCullough and Alexander Dow, Pawtucket.

The R. Wallace & Sons Co., Wallingford, Conn., has asked for a factory addition, 40 x 100 ft., three stories.

The Henry Souther Engineering Co., Hartford, Conn., is having plans drawn for an addition, 35 x 35 ft., two stories, and for raising the present building another story.

The Perfection Machine Co., Boston, Mass., motion picture machines, has been incorporated with authorized capital stock of \$99,000. Louise Stewart is president and Jeremiah Moriarty, 93 Broad Street, treasurer.

The Paterson Forge Co., James Paterson, proprietor, whose shops were destroyed by fire about a year ago, will resume operations in about three to four weeks at its new plant in Stratford, Conn., with much increased facilities.

Philadelphia

PHILADELPHIA, July 29.

The Hero Mfg. Co., Gaul and Adams streets, Philadelphia, manufacturer of brass, bronze and aluminum products, is building a one-story addition to its plant on Stokley Street, 40 x 200 ft., to cost \$30,000.

The Department of Public Safety, Philadelphia, is having plans prepared for a new municipal repair shop at Eleventh and Reed streets, to cost \$40,000. The equipment to be installed will include an electric plant, comprising boilers, motor generators, air compressors, etc. A complete shafting system for machine operation will also be installed.

The Tacony Ordnance Corporation, Tacony, Philadelphia, has awarded contract to Barclay, White & Co., 1713 Sansom Street, Philadelphia, for the construction of a one-story brick and reinforced-concrete addition, 40 x 50 ft.

Fire, July 24, destroyed part of the blacksmith and forge shop at the works of the William Cramp & Sons Ship & Engine Building Co., Beach and Ball streets, Philadelphia, with loss estimated at \$30,000.

The C. H. Wheeler Mfg. Co., Eighteenth Street and Lehigh Avenue, Philadelphia, manufacturer of pumping machinery, etc., has awarded contract to John N. Gill & Co., Otis Building, for a one-story brick addition, 48 x 65 ft., to be used as a shop extension; a one-story boiler house, 41 x 50 ft., will also be erected. The structures will cost about \$17,500.

The Standard Dental Mfg. Co., Twenty-fifth and Diamond streets, Philadelphia, will build an addition on West Norris Street to cost \$6,000.

The American Bridge Co., Trenton, N. J., has suspended operations on the construction of steel barges at its local plant, a department of work inaugurated about three years ago, and since which time 16 steel vessels of this type have been completed at the works. It is understood that the location of the plant and the difficulty of delivering the barges has caused this change. In the future the primary activities will be devoted to the fabricating of steel for shipbuilding work, and it is proposed to extend this feature of operation. The local plant is now producing steel for 30 vessels to be erected by the Merchant Shipbuilding Corporation, Bristol, and for 20 vessels for the Federal Shipbuilding Co., Kearny, N. J.

Fire, July 18, destroyed the coal tipple of the Pennsylvania Coal & Coke Corporation, Patton, Pa., with an estimated loss of \$30,000. It is understood that the plant will be rebuilt.

The Standard Stoker Co., Gaskell Avenue, Erie, Pa., is building two one-story additions to its foundry, each 35 x 35 ft., to cost \$10,000.

The Reading Standard Co., Reading, Pa., manufacturer of motorcycles, bicycles and parts, has been taken over by A.

Mitchell Palmer, Allen Property Custodian. The plant has been working on Government contracts and giving employment to about 300 persons, and it is understood that operation will continue under the direction of new officials. The company has been affiliated with the Bosch Magneto Co., New York, recently taken over by the Government. A. T. Murray and A. E. McGavin have been appointed president and general manager, respectively, of the local plant.

The American Bronze Corporation, Berwyn, Pa., has awarded contract to Crowell, Lundoff & Little, Cleveland, Ohio, for a large addition to its works to be completed Aug. 1, and to triple its capacity for making bronze, by Sept. 1. John W. Watson is president and general manager.

The Philadelphia district agency for the C. W. Hunt Co., New York, ash-handling equipment, industrial railroads, etc., is F. W. Trimble & Co., not E. W. Trimble & Co., as was stated in THE IRON AGE of July 18.

The Pennsylvania Equipment Co., dealer in railroad and contractors' equipment, new and second-hand machinery, Crozer Building, is in the market for a steam drop hammer, 4000 to 8000 lb.; also a 500-ton hydraulic forging press, distance between columns approximately 7 x 10 ft. James E. Bough is manager.

Baltimore

BALTIMORE, July 29.

The Bartlett-Hayward Co., Scott and McHenry streets, Baltimore, will construct a one-story plate shop, 24 x 140 ft. Parker, Thomas & Rice are the architects. The contract has been awarded to Morrow Brothers, Baltimore.

Vaile & Young, 216 North Calvert Street, Baltimore, metal cornice and roofing manufacturers, have awarded contract to Frairie Brothers & Haigley for constructing a one-story brick factory, 72 x 105 ft., at Bush and Ridgely streets, to cost \$10,000.

The American Utensils Co., 206 North Calvert Street, Baltimore, has been incorporated with \$100,000 capital stock by Ulysses G. Bishop, William J. Turner and Winfield E. Beverage to manufacture housefurnishing goods, cooking utensils, etc.

The plant of the American Cellulose & Chemical Co., to be built at Cumberland, Md., it is understood, will cost several million dollars and will be financed by the Vickers Co., New York, and the Nobel Co., London, England.

The Virginia Iron, Coal & Coke Co., Roanoke, Va., plans the construction of a foundry and machine shop at its Dora furnace, Pulaski, Va.

The Union Mfg. & Novelty Co., 102 Law Building, Baltimore, has been incorporated with \$50,000 capital stock by Jesse and Rose B. Rosenfeld and Edwin T. Dickerson to manufacture metal devices and novelties.

The Bureau of Yards and Docks, Navy Department, Washington, has had plans prepared for a cold storage basin, with traveling crane, etc., to be erected at Indian Head, Md., at a cost of about \$125,000.

The Boyden Co-ordinating Car Corporation, Baltimore, has been incorporated with a capital stock of \$100,000 by George A. Boyden, Theodore G. Lurman and Robert Ramsay to manufacture railroad cars, trucks, etc.

The Norfolk & Western Railway, Roanoke, Va., is reported considering the erection of new shops at Hagerstown, Md.

Contract for the erection of the new plant of John T. Lewis & Brothers Co., Baltimore, a branch of the National Lead Co., has been awarded to the McIver Construction Co., Law Building, Baltimore, at a cost reported to be about \$1,000,000. The contract includes the erection of a main brick and concrete structure, 100 x 300 ft., and a number of smaller buildings. The works will be located on Columbia Avenue, and will be devoted to the manufacture of shrapnel balls. C. A. Geatty is manager.

The War Department, Washington, has completed plans for the construction of a new aircraft works at Aberdeen, Md., to cost about \$1,000,000. The structures will include machine repair shops in connection with hangars and other buildings.

The Bethlehem Steel Co., Bethlehem, Pa., will build a new electric power plant at its shipbuilding works at Sparrows Point, Md.

The Phillips Sheet & Tin Plate Co., Wheeling, W. Va., has made application to the Secretary of State for permission to increase its capital from \$5,500,000 to \$30,000,000.

The Floyd Elkhorn Consolidated Collieries, Bristol, Va., recently organized to take over and operate the Floyd-Elkhorn Coal Corporation and other companies, is planning the

installation of a new electric power plant, mining machinery and equipment to cost over \$100,000.

A new electric power plant addition to cost about \$23,000 will be constructed by the Central Hospital for Insane, Raleigh, N. C. The equipment and machinery, including boilers, etc., will cost about \$45,000.

The Monarch Dobbin Cleaner Co., Union, S. C., has been incorporated with a capital of \$10,000 to manufacture cotton machinery and machinery parts. A. H. Cottingham and D. A. Doyd, Union, are the incorporators.

The Mason Coal & Chemical Co., Hartford, W. Va., is planning for the installation of new machinery and equipment at its properties to provide for increased production; new mining cars will also be purchased.

Pittsburgh

PITTSBURGH, July 29.

The Jones & Laughlin Steel Co., Pittsburgh, has filed plans for the construction of additions to its works at Hazelwood, to cost \$389,000. The structures will include a one-story, brick and steel machine shop, \$29,000; one-story, brick and steel boiler plant, \$163,000; one-story benzol works, \$42,000; one-story pump and still building, \$20,000; one-story laboratory, \$13,000; naphthalene works and other buildings. The company has also purchased property adjoining its plant, consisting of sites, 69 x 78 ft. and 24 x 122 ft., at Kansas and Longworth streets, for a consideration of \$17,800, to be used for extensions.

The McCairns Foundry Co., manufacturer of coke oven doors and gray-iron castings, Connellsville, Pa., is erecting a foundry addition, 60 x 65 ft. All equipment has been purchased except a 5-ton electric traveling crane of 37-ft. 10-in. span, to be operated from the floor. A second-hand crane in first-class condition will suffice. James McCairns is president.

The McLanahan-Stone Machine Co., Hollidaysburg, Pa., plans the erection of a machine shop, 40 x 100 ft., with 20-ft. leanto on each side, to cost about \$20,000. The center span is to accommodate an electric traveling crane. The company's foundry was not destroyed by fire as current reports indicated. William F. Kirk is manager.

The E. T. Lippert Saw Co., 608 Lincoln Avenue, Millvale, Pa., manufacturer of saws, etc., has awarded a contract to R. H. Fisher, Holmes Street, Pittsburgh, for the construction of a three-story and basement addition to its machine shop, 37 x 144 ft., to cost \$40,000.

The Robert L. Ream Co., Pittsburgh, has been incorporated in Delaware with capital of \$15,000, to manufacture mechanical rubber goods, belting, etc. Harry W. K. Smith, Frank M. McKelvey and John T. Akers, Pittsburgh, are the incorporators.

The Electric Reduction Co., Washington, Pa., has awarded a contract to the Austin Co., Cleveland, for the construction of a two-story machine shop and boiler house, 30 x 60 ft., to cost \$15,000.

The Carbon Steel Co., Pittsburgh, has purchased the former Lupton foundry building at Railroad and Thirty-second streets, for about \$95,000. The building, on a site 120 x 165 ft., will be used as an extension to its works.

The Fawcett Machine Co., Pittsburgh, manufacturer of gears, transmissions, etc., has broken ground for a two-story addition to its machine shop, 70 x 100 ft., at Ford City. A one-story addition to the pattern shop, 100 x 150 ft., will also be erected.

P. Pettler & Son, Beaver Falls, Pa., will purchase an 8-ft. boring mill, a 22-in. roll grinder and a large centering lathe.

The Savage Arms Corporation, Sharon, Pa., is seeking a Newton adjustable upright duplex milling machine or equipment, also a No. 8 Williams, White & Co. bulldozer or equal.

Chicago

CHICAGO, July 29.

Distributors of machine tools continue to work at high pressure. With some sellers the month looms up as the biggest in point of aggregate volume of sales of any of the year, and this despite the fact that the bulk of business is made up of small sales. War business involving metal working is permeating the entire territory served by Chicago. Quite a bit of the demand is for the smaller tools, on which quick delivery can be made.

The concentration on production of essentials has made it possible for dealers and rebuilders of machines to secure

some good second-hand tools, although high prices have to be paid. In some cases, where shops have not engaged in war work, the owners have been willing to let go of some of their machinery, taking a good price now, and intending to replace the equipment when they are permitted to proceed along normal lines.

The aviation school at the Great Lakes Naval Training Station, Great Lakes, Ill., which already has a large number of tools, as previously reported, is to double the size of its plant, the foundations for the addition being in. It trains young men for repair work on airplanes, and after they are proficient sends them to the various aviation fields. The students are mechanics when they enter the school.

The Falls Motor Co., Sheboygan Falls, Wis., which has contracts for motor truck motors, has closed against its large list.

The Amalgamated Machinery Corporation, Edison Building, Chicago, maker of shell machinery, gun-boring machines, etc., has purchased the property it occupies on Racine Avenue, near Thirty-fifth Street. It has been reported that the company intends an expansion of its activities, but this is denied by the officials. It has immense orders booked and is working at full pressure.

Permits issued to the United States Government for buildings to be occupied by the Symington-Chicago Corporation, 122 South Michigan Avenue, Chicago, which is to make shells, total \$1,855,000. The plant is to be on a tract between Ashland and Robey streets and Seventy-fourth and Seventy-fifth streets. The latest permits are for sections of the main building, which is to be 350 x 2100 ft. The various buildings, or sections, include the following:

Tool and machine shop, 80 x 250 ft., 50 x 400 ft. and 2 x 400 ft.

Forge shop, 220 x 425 ft.

One-story shop, 247 x 922 ft.

Heat-treating building, 185 x 190 ft.

Three small buildings.

Brick chimney, 6½ ft. in dia. and 150 ft. high.

The Eddy Foundry Co., 372 West Grand Avenue, Chicago, has purchased property at the northeast corner of Menard and Fillmore avenues, Chicago, which will be improved with a one-story building, about 90 x 300 ft.

Engineers representing the Baldwin Locomotive Works, Philadelphia, have been investigating the conditions of the company's property at East Chicago, on which it is reported that the company will build a \$5,000,000 plant. Foundations which were placed on the site in 1914 are being tested, likewise trackage. The land is being levelled also, and hopes are strong that this is the forerunner of building operations.

Plans have been completed for a two and one-story and basement tannery, 75 x 76 ft., Blackhawk Street near Dayton Street, Chicago, which is to be occupied by the Chicago Tanning Co., C. E. Frazier, 30 North Dearborn Street, being the architect. It will cost \$13,000.

The Winslow Brothers Co., 4600 West Harrison Street, Chicago, shell-maker, has been granted a permit for the erection of a one-story steel heat-treating building, 22 x 67 ft., to cost \$10,000.

The Interstate Iron & Steel Co., Seventy-ninth Street and South Chicago Avenue, Chicago, will erect a one-story blacksmith shop, 24 x 48 ft., to cost \$5,000.

The Chicago Bridge & Iron Works, 1311 West 16th Street, Chicago, will erect a two-story addition, 48.6 x 54 ft., to its temple shop, at a cost of \$10,000.

The Manufacturers' Equipment Co., Chicago, has purchased property, 316 x 330 ft., at Waller and Fillmore streets, and will erect a one-story factory to cost \$50,000.

The American Tool & Machine Co., 1422 Bryant Place, Chicago, has purchased a building in Hastings, Mich., and will remove to that city.

The Eastern Steel Car & Foundry Co., Brandon Avenue and 136th Street, Chicago, has filed plans for the construction of a brick and steel addition to its plant to cost \$38,000.

A new nine-story cold storage plant, to cost about \$350,000, will be erected by the William Davies Co., Ltd., South Union Avenue, Chicago. It will be 125 x 145 ft., and located on Union Avenue, near Forty-first Street.

The Illinois Co-operative Packing Co., Ottawa, Ill., will build a power plant in connection with its new packing works in course of construction. The entire plant is estimated to cost about \$125,000.

The Duncan Mfg. Co., Chicago, has been incorporated in Delaware with a capital of \$300,000 to manufacture stoves, boilers, etc. W. G. Rice and T. B. Eaton, Chicago, and J. W. Hatch, Rockford, Ill., are the incorporators.

Milwaukee

MILWAUKEE, July 29.

A feature of machine-tool industry is the attention which buyers are paying to the lighter types of milling machines. For a long time these have been rather neglected, the demand having been confined largely to the heavier styles. Now, however, a considerable number of the lighter machines are being taken, and in the past week a telegraphic inquiry was received on a lot of 62 light millers from an Eastern interest which is manufacturing bayonets. This is the largest lot of light tools of this class that has come to the attention of local makers in some time and it is expected that more business of this character will be offered as the conversion of Middle Western industries to war work progresses. This is involving retooling which is of special interest to milling-machine builders.

The skilled labor situation continues acute. Machinists are so scarce that in many plants the night shifts consist of only 15 to 25 per cent of the number required. Unskilled labor is easier because of the releasing of thousands from non-essential occupations by the work-or-fight order. These men have rushed to the machine shops on expectation of high wages and there is keen competition for jobs.

The Lavine Gear Co., Racine, Wis., which is building a new manufacturing group in Milwaukee, is undergoing notable changes in preparation for its transfer to this city. The capital stock is being increased from \$100,000 to \$1,000,000, to accommodate the expansion of business, and the number of directors will be five instead of three. The company is controlled by Herman A. and George Uihlein. Originally the Lavine industry was established in Detroit, but about six years ago it was moved to Corliss, near Racine, and later into a larger plant within the city. The name has since been changed from Lavigne Gear Co. to the present simplified style of Lavine Gear Co. The company manufactures steering gears and other parts for automobiles, motor trucks, tractors and airplanes. Work is progressing rapidly on the new plant in Milwaukee, at Keefe Avenue and Booth Street, which will be 175 x 290 ft.

The Standard Foundry Co., Racine, Wis., has been reorganized following the purchase of the major interest of Albert and Henry Kousek, founders of the business, by Arthur R. Janes, who has been a stockholder and vice-president for some time. Mr. Janes has been elected president and general manager; David G. Janes, vice-president, and E. L. Mikveka, secretary and treasurer. The plant has been idle for several weeks because of labor difficulties. The new owners have adjusted the dispute and will resume operations immediately. It is said that the purchase price was approximately \$75,000. Reports that the Belle City Malleable Iron Co., Racine, has taken a financial interest in the company under the reorganization are officially denied.

The Falls Motors Corporation, Sheboygan Falls, Wis., has awarded contracts for another machine-shop addition, 60 x 125 ft., two stories, of brick and steel, to provide much-needed capacity for executing Government contracts for automobile, truck, tractor and aviation engines and parts.

The Thilmany Paper & Pulp Co., Kaukauna, Wis., has started work on a two-story brick and steel building, 70 x 100 ft., to contain a machine-shop, blacksmith shop, pipe-fitting room and other mechanical service departments.

The Invincible Metal Furniture Co., Manitowoc, Wis., is increasing its capital stock from \$75,000 to \$100,000, and contemplates the erection of an addition to handle Government requirements. The principal products are steel filing cabinets, talking machine cabinets, and similar stamped sheet metal goods. Emil Krug is general manager.

Swift & Co., Chicago, lessee of the Plankinton Packing Co., Muskego Avenue and Canal Street, Milwaukee, will build a power plant addition, 35 x 70 ft., and has purchased additional machinery, boilers, automatic stokers, etc. A 100-ft. stack is included in the project. Harry S. Culver is general manager.

The Acme Metal Parts Co., Milwaukee, has leased the upper floors of the building at 495-501 Broadway, pending the reconstruction of its plant at 1454 Eighth Avenue, destroyed by fire last week. It has been decided not to rebuild for the time being. Some new equipment is being purchased.

The Jenkins Machine Co., Sheboygan, Wis., has been granted a permit to build a \$12,000 shop addition. The company manufactures wood-working machines and tools.

Christ C. Mortenson, Racine, Wis., is organizing a company to engage in the manufacture of a patented lock-nut. It is planned to employ from 25 to 30 workmen at the beginning.

The Universal Machinery Co., 754 Thirtieth Street, Milwaukee, is taking bids through Siebert & Gray, architects, 86 Michigan Street, for the construction and equipment of a

power plant, 60 x 75 ft., to serve the new foundry and machine-shop which it is building at Sixty-fourth and Pullen avenues, West Allis. Generators, transformers, switchboards, etc., are being purchased. E. C. Devlin is president.

The Reliance Motor Truck Co., Appleton, Wis., has completed the transfer of the machinery, tools and equipment of its former plant at Racine, Wis., to the new shop in Appleton, which will be ready to start operations Aug. 1 or 5. The building is one story, 175 x 290 ft. Ira L. Miller is president.

Detroit

DETROIT, July 29.

The constantly increasing orders in this district for munitions are resulting in numerous large inquiries and orders for machine tools. Standard high grade machines are in special demand but miscellaneous and small orders have decreased.

A delegation of leading business men will go to Washington this week in an effort to secure coal for homes in Detroit, pointing out that if the present shortage continues employees of munition factories will leave the city or lose greatly in efficiency. Industries are better supplied than they have been for some time. Included on the committee which will go to Washington will probably be John Dodge, Henry Ford, and 12 other leading manufacturers and business men, including the State and city fuel administrators.

The Transport Truck Co., Mount Pleasant, Mich., has been organized with a capital stock of \$1,000,000 to manufacture trucks. It is headed by Milton A. Holmes, for four years sales manager of the Republic Motor Truck Co., Alma, Mich. The directors include H. E. Chatterton, A. E. Gorham, W. D. Wood, E. J. McCall, David Warner and Milton A. Holmes.

Among the contracts and purchases recently announced by the Government are the following to concerns in Michigan: Depot Trailer Co., Detroit, reversible trailers; McCord Mfg. Co., Detroit, radiators; American Logging Tool Co., Ewart, cleaves; H. D. Edwards & Co., Detroit, steel blocks; Detroit Stove Works, Detroit, heaters; Acme Boiler Works, Detroit, oil tanks; Packard Motor Car Co., Detroit, trucks; Ford Motor Co., Detroit, gears; Detroit Forgings Co., Detroit, forgings.

The South Haven Foundry & Machine Co., South Haven, Mich., has been organized with a capital of \$25,000, by Herbert E. Skinner, Aaron W. Harriman and Samuel H. Wilson.

The Fuller & Sons Mfg. Co., Kalamazoo, Mich., has completed various additions to its plant, after 15 months of construction work. The principal addition is the new heat treating plant.

The Peck Iron & Steel Co., manufacturer of foundry equipment, Kalamazoo, Mich., which began operations 18 months ago, has been incorporated with a capital stock of \$30,000. W. W. Peck is president and general manager; W. N. Sidman, vice-president, and W. H. Peck, secretary-treasurer.

The Detroit Reamer & Tool Co., Detroit, announces that it has taken over the Welsmore Mfg. Co. and will continue to manufacture high speed reamers, cutters, end mills and special tools.

The Central Forge Co., Boyer Campbell Building, Detroit, is building a new drop forge works on Euclid Avenue to cost about \$350,000.

The Saginaw Malleable Iron Co., Saginaw, Mich., has had plans prepared for a new one-story foundry.

The Becker-Cole Electric Co., Lansing, Mich., has increased its capital to \$50,000.

Cleveland

CLEVELAND, July 29.

The machinery market quieted down considerably the past week. Manufacturers and dealers state the demand for single machines or lots of two or three is holding up fairly well, but new inquiries for round lots are lacking. It is reported that the Midvale Steel & Ordnance Co. will purchase from 300 to 400 machines for its Nicetown works. The Chevrolet Motor Co., Flint, Mich., is preparing to engage in munition work and has purchased machinery to the amount of about \$50,000. The Truscon Steel Co., Youngstown, Ohio, has purchased some equipment for the manufacture of gas shells. There is a steady demand for automatic machinery and turret lathes from scattered sources, orders being almost wholly for single machines. The demand for punching and shearing machinery for shipyards and car plants continues heavy. The Ralston Steel Car Co., Columbus, Ohio, has placed 15 punching and shearing machines, and the Reeves Brothers Co., Alliance, Ohio, 5 punching machines, both orders being taken by the Cleveland Punch & Shear Works Co. The Standard Steel Car Co. is inquiring for 25 punching and

shearing machines for New Castle, Ind., and Curtis Bay, Md., and the Newport News Shipbuilding & Dry Dock Co. is inquiring for 5 punching machines. The Timken Roller Bearing Co., Canton, is inquiring for 80 grinding machines of various types.

A large volume of crane business is pending. It is expected that the Neville Island gun plant of the United States Steel Corporation will require from 400 to 500 cranes. One inquiry for this plant is for 104 cranes of one type of 5 and 10-ton capacity. The crane requirements for the Nicetown howitzer plant of the Midvale Steel & Ordnance Co., which are before the trade, it is stated cover approximately 100 cranes amounting to \$1,000,000. The New York Shipbuilding Co. has just placed three large cranes of the gantry type with the Brown Hoisting Machinery Co., Cleveland.

The Lake & Ocean Shipbuilding Co., Cleveland, has been formed to build ocean tugs. It will establish a shipyard at the foot of East Fortieth Street, where a shop and ways will be built. The company plans to engage only in the assembling of boats. Sub-contracts will be placed with local fabricating and other plants for the steel, engines, boilers, etc. These sub-contracts, for the most part, will be handled by plants in the immediate vicinity of the shipyard. It contemplates spending \$50,000 in fitting up its plant, but about all the machinery that will be required will be air compressors and air tools. It has taken a Government order for three 150-ft. ocean-going tugs, and advises three more have been promised. James Craig, vice-president and general manager National Iron & Wire Co., is president; J. J. Cassidy, vice-president; and W. A. Fay, secretary and treasurer.

The Globe Machine & Stamping Co., Cleveland, has under construction a four-story building, 60 x 220 ft., to be completed about Oct. 1, which will be used for the assembling of incendiary bombs, the manufacture of which it recently commenced.

The Cleveland Punch & Shear Works Co., Cleveland, will enlarge its plant by an extension 106 x 129 ft., to its machine shop. It will be largely of steel and glass construction.

The Atlantic Foundry Co., Cleveland, will erect a two-story building, 60 x 111 ft., for storage purposes.

The Kilby Mfg. Co., Cleveland, will build a new gray iron foundry on the site of its present plant. It will be 55 x 220 ft., with 20-ft. lean-tos and equipped with two cupolas. The present foundry has one cupola, but the company has a second cupola which will be rebuilt. It specializes on sugar-making machinery, but as material for this machinery has a lower priorities rating than that for many other products, the company has arranged to devote a large share of its manufacturing facilities to the building of punching and shearing machines.

The Hahn Mfg. Co., 5332 Hamilton Avenue, Cleveland, will build a one-story and basement addition, 77 x 80 ft., to be used for machine shop, boiler house and storage purposes.

The F. B. Stearns Aircraft Parts Co., Cleveland, recently organized, has established a plant in the Ajax Building, Cleveland for the manufacture of airplane parts.

The Meilink Mfg. Co., Toledo, Ohio, will double the capacity of its plant to take care of a Government contract for steel safes and other equipment for offices.

The Toledo Shipbuilding Co., Toledo, will erect a machine shop, 34 x 200 ft., and a paint shop, 80 x 340 ft.

The Bowling Green Die & Tool Co., Bowling Green, Ohio, has been organized, with a capital stock of \$25,000, by R. L. Schwartz, William Gallisher, B. H. Urschel, and others. It contemplates establishing a plant shortly for the manufacture of tools and dies, which will be in charge of Mr. Schwartz.

The Timken Roller Bearing Co., Canton, Ohio, has increased its capital stock from \$200,000 to \$10,000,000. It is stated that the company is planning the erection of a power plant and the building of further extensions to its various departments.

The Johant Heating Co., Akron, Ohio, is buying some machinery equipment for the manufacture of a line of mechanics' vises which it plans to bring out.

A large plant will be erected in Hamilton, Ohio, for the manufacture of the Fordson tractor, where the business of Henry Ford & Son will be taken care of for the states of Ohio, Illinois and Indiana, as well as all the states south of the Ohio River. It is said that more than 30 acres of ground have been acquired and construction will start at an early date.

Cincinnati

CINCINNATI, July 29

Gunmakers lately have practically duplicated their orders for machine tools. Lathes from 24-in. swing and larger are urgently needed. The smaller sizes are not in such great demand. No large lists have been issued recently and orders are now placed very quietly. Planing machines of all sizes are wanted by manufacturers engaged in war work. Shaping machines are also in a little better demand. Makers of portable electric drilling machines continue to make very optimistic reports, but some of them are handicapped for supplies. The foundry situation is improving and castings are being delivered to machine tool makers in much better volume.

Makers of sugar machinery are busy on a number of contracts pending in Cuba and Louisiana although this is not the season of the year for buying such equipment.

The Peters Cartridge Co., First National Bank Building, Cincinnati, has acquired the former plant of the R. K. Le Blond Machine Tool Co., Linwood. It is officially confirmed that the plant will be fitted up for making light arms cartridge cases that will be sent to Kings Mills, Ohio, for loading. Practically all the machinery has been bought, but some transmission equipment is yet to be provided for.

The Mosler Safe Co., Hamilton, Ohio, has commissioned F. G. Mueller, architect, Hamilton, to prepare plans for extensions to its plant in East Hamilton. An addition to the machine shop will be 50 x 500 ft., one story, of concrete and brick. A warehouse, 50 x 350 ft. is also planned. The company has Government contracts for gun carriages.

The Kelley-Koett Mfg. Co., Covington, Ky., is making an addition to its plant on West Fourth Street. It is engaged in the manufacture of X-ray machines for the Government.

The Ohmer Fare Register Co., Dayton, Ohio, has recently received a Government contract for gun mountings and sights and will make further additions to its plant. No information is available as to the equipment that will be required.

Frank L. Packard, architect, Hayden Building, Columbus, Ohio, is preparing plans for the machine shop and roundhouse that will be erected by the Pennsylvania Railroad Co. in Columbus.

The Superheating Boiler Co., Columbus, has been incorporated with \$10,000 capital stock by H. L. Southard and others. Nothing is known as to manufacturing plans.

The Liberty Die & Tool Co. has removed its plant from Indianapolis to 79 East Chestnut Street, Columbus, Ohio.

The Armstrong-Lambert Co., 210 West Broad Street, Columbus, maker of metal doors, will build an addition to its plant.

The Murray Pump & Valve Mfg. Co., New Lexington, Ohio, has been incorporated with \$50,000 capital stock. R. W. Murray is one of the principal incorporators.

Indianapolis

INDIANAPOLIS, July 29

The Rensselaer Mfg. Co., Rensselaer, Ind., has been incorporated with \$1,000,000 capital stock and has acquired the charter and other property of the Ideal Motor Co. and taken an option on the buildings and machinery of the Columbia Furniture Co. It will assemble motor trucks from standard parts and may manufacture ambulance bodies and furniture. John A. Dunlap is president and Schuyler C. Irwin, secretary-treasurer.

The Motor Products Co., Indianapolis, has been incorporated with \$12,000 capital stock to manufacture automobiles. The directors are Benjamin D. Aufderheide, Albert R. Lazure and Harry F. Dunn.

The Spiro Spark Plug Co., Noblesville, Ind., has been incorporated to manufacture spark plugs. The incorporators are J. R. Pierson, Joel D. Sturdevant and Orph H. Wheeler.

The Industrial Supply Co. has increased its capital stock from \$10,000 to \$100,000 and has changed its place of business from Brazil to Terre Haute, Ind.

The Eubank All-Metal Snares Co., Indianapolis, has been incorporated with \$10,000 capital stock, to manufacture snares and other devices and machinery. The directors are J. C. Eubank, G. W. Hancock and F. M. Gabbert.

The Positive Drive, Inc., Indianapolis, has been organized with \$60,000 capital stock to manufacture a positive drive for automobiles and other motor vehicles. The directors are William T. Rasmusser, Charles R. Yoke and C. Fred Davis.

The Home Elevator Co., Indianapolis, manufacturer of elevators, has increased its capital stock from \$5,000 to \$50,000.

The Indiana Lamp Co., Connersville, Ind., is building a new two-story plant, 50 x 200 ft., to cost \$100,000.

The Pennsylvania Railroad, Logansport, Ind., is planning for extensions at its works to cost \$150,000, which will include remodeling of the engine house, addition to power plant, etc.

The Monterey Electric Light & Power Co., Monterey, Ind., is planning for the construction of a new one-story power plant, about 50 x 125 ft., to cost \$25,000.

St. Louis

St. Louis, July 29.

The Schultz Belting Co., 402 Barton Street, St. Louis, is extending its plant and installing additional machinery at a cost of about \$10,000. It will be in the market for new machinery within the next few months, as it plans to enlarge its plant further by at least 30 per cent.

The Davis Boring Tool Co. is building an addition to its plant at 3718 Forest Park Boulevard, St. Louis, and will install about \$75,000 worth of lathes, drill presses and grinding machinery. It plans to double its present capacity.

The Newton Valve Co., St. Louis, has purchased the property occupied by its plant at 2612-18 La Salle Street, and has completed the installation of \$35,000 worth of machinery. It is now in the market for about \$15,000 worth of punch presses and screw machines.

The machinery and other property of the Southwestern Screen Mfg. Co. at 2914 Nebraska Avenue, St. Louis, have been ordered sold at auction.

The Baker Stove Works, Belleville, Ill., is reported to have received an order from the Government for 5000 hot blast heaters for France for the use of the American Expeditionary Forces.

The Fulton Iron Works Co., 1259 Delaware Avenue, St. Louis, will let the contract within the next few weeks for a \$6,000 addition to its power plant and will install a 470 hp. boiler.

The plant formerly occupied by the Wilson Stove Co., Valley Park, Mo., has been leased by the newly organized Western Cotton Gauze Co., which is in the market for cutting machines and other tools. Ralph McKittrick, 37 Vandeventer Place, St. Louis, heads the company.

The Conway Cotton Oil & Gin Co., Conway, Ark., has increased its capital by \$25,000 for the purchase of additional ginning and cotton oil pressing machinery.

The Bolivar Compress Co., Cleveland, Miss., has been organized by H. L. Gaines, president, and others, and will install \$30,000 worth of machinery at once.

The Commonwealth Public Service Co., Ashdown, Ark., will install an additional unit in its generating plant, requiring both engine and dynamo.

The Holden Electric Light Co., Holden, Mo., will rebuild its electric light and power plant recently destroyed by fire.

The Savannah Light & Milling Co., Savannah, Mo., E. E. Whitaker, president, will equip a plant requiring about \$1,500 worth of machinery, for which the company is now in the market.

The city of Stillwater, Okla., J. L. Moore, clerk, will receive bids until Aug. 12 for one 250 kv.a. 2300 volt, three-phase cycle generator, current transformers, boiler, heater, engine, etc.

The Dust Mulch Plow Co., Kingfisher, Okla., C. D. Shaw and others interested, will equip a \$100,000 plant for the manufacture of plows.

The city of Meridian, Miss., will expend \$100,000 to \$150,000 on a municipal ice-making plant.

The Louisiana Western Railroad, H. R. Parsons, general manager, New Orleans, will equip a roundhouse and machine shop at Lake Charles, La.

Price & Norris, Yazoo City, Miss., are in the market for about \$7,000 worth of woodworking machinery for re-equipping their plant, recently burned.

The Willis Welding & Cutting Co., North Eleventh Street, St. Louis, is planning for the construction of a two-story addition, 30 x 50 ft., at Market and Eleventh streets.

The A. Gilbert & Sons Brass Foundry Co., Forest Park Boulevard, St. Louis, is enlarging its plant by an extension to the machine shop and foundry, and two-story extension to the factory, estimated to cost \$15,000. The company recently increased its capital from \$50,000 to \$100,000.

The Alois Aufrechtig Copper & Sheet Iron Mfg. Co., South Third Street, St. Louis, has recently been incorporated with a capital of \$100,000 to operate a plating works for steel, copper and tin products. Charles Aufrechtig is president.

Texas

AUSTIN, July 27.

The Liberty Hardwood Milling Co., Houston, has been incorporated with a capital stock of \$20,000. H. J. Nichols is a stockholder.

The refinery which the Lone Star Oil & Refining Co., Coleman, is preparing to construct will have an initial capacity of about 100 bbl. per day, which will be increased from time to time. A. F. Baldersall is president.

The Markham Gin & Milling Co. will construct a cotton gin at Markham. R. D. Dixon is a stockholder.

The McLendon Gin Co., Bay City, has been incorporated with a capital stock of \$15,000 and will construct a cotton gin. C. M. Carter is a stockholder.

California

LOS ANGELES, July 23.

The Southern California Shipbuilding Corporation, Los Angeles, recently incorporated with a capital of \$2,000,000, is planning for the construction of a plant at Los Angeles Harbor on about 60 acres of tidelands. Hamilton W. Barnard, A. E. Cronewedd, W. M. Carpenter, F. H. Wells and Henry Prince, Los Angeles, and Henry J. Morton, San Francisco, head the company.

The Paschall Tool Co., Long Beach Bank Building, Long Beach, has increased its capital to \$15,000.

The Ontario Power Co., Ontario, Cal., has been granted permission to construct a hydroelectric power plant in the San Antonio canyon section to cost about \$64,500.

The Drew Carriage Co., Ontario, has filed plans for a one-story extension to cost about \$5,000.

A. Coch and W. B. Roberts, San Diego, associated with the Buchanan Lumber Co., are planning for the construction of a shipbuilding works on San Diego Bay on property which has been leased. Barges, schooners and similar vessels will be built.

The Southwestern Shipbuilding Co., Los Angeles, is considering the construction of additional shipways at its works at San Pedro Harbor. The company has received a Government contract for the construction of 10 steel vessels, each of about 9500 tons, to cost approximately \$1,750,000 each.

The ice manufacturing plant of the Standard Oil Co., Colinga, Cal., and several other buildings were destroyed by fire July 11, with loss of about \$45,000.

The Western Fibre Co., Los Angeles, has been incorporated with a capital of \$500,000 to manufacture fibre products. H. A. Landers, E. A. Hawkins and C. L. Wallis are the incorporators.

The San Diego Consolidated Gas & Electric Co., San Diego, is planning for the enlargement of its electric plant and extensions in its power system. The company has recently been granted permission to issue bonds for \$1,100,000.

The Government has awarded a contract to Lange & Bergstrom, Sharon Building, San Francisco, for the construction of a new aircraft works on North Island, San Diego, consisting of a one-story machine shop, carpenter shop and other buildings. The cost will be about \$400,000.

The new works of the Emergency Fleet Corporation, Washington, at San Diego, will include the property formerly leased to the United States Steel Shipbuilding Corporation at the foot of Twenty-eighth Street and extending south to National City. This site will allow for double the capacity of the plant as previously planned. The Schofield Engineering Co., San Francisco, has the contract, and will also operate the works for the construction of steel-concrete vessels. The initial works, it is said, will cost about \$900,000, of which \$750,000 will be for machinery and equipment.

A one and two story plant to cost about \$75,000 will be constructed by the Steele Packing Co., 2302 Belt Street, San Diego. The buildings will be 65 x 170 ft and 48 x 125 ft., and will provide for the employment of 400 persons for initial operations. About \$50,000 will be expended for equipment.

The Hoover Hardware Co., Long Beach, Cal., has been incorporated with a capital of \$10,000 to manufacture hardware, etc. C. L. Hoover and L. N. Whealton, Long Beach, are the incorporators.

The Salt River Valley Water Users' Association, Phoenix, Ariz., is planning for the construction of 40 electrically driven pumping plants to cost about \$500,000.

Benedict & Westphal, Los Angeles, has been organized to operate a plant at 529 West Eighth Street for the manufacture of refrigerating apparatus. C. E. Benedict, 214 North Kingsley Drive, heads the company.

The Walker Interlocking Portable Construction Co., Los Angeles, has been incorporated with a capital of \$50,000 to manufacture metal portable interlocking equipment, etc. James A. Walker, Ernest B. Coll and Everett L. Ball are the incorporators.

The Oakland Galvanizing Works has established a plant for specializing in ship work at 201-203 Market Street, Oakland, consisting of three buildings. R. B. Finn of the John Finn Metal Works, San Francisco, and E. K. Cooley of the San Francisco Galvanizing Works, San Francisco, are the proprietors. F. L. Cooley is manager.

The Pacific Northwest

PORTLAND, Ore., July 23.

As a result of the visit of Charles M. Schwab, director general of the Emergency Fleet Corporation, and Charles A. Piez, \$200,000,000 worth of ships are to be built in Portland within the next year. Contracts awarded allow the Columbia River Shipbuilding Co. and the Northwest Steel Co. to enlarge their plants. It is also expected that a considerable amount of machinery will be rushed to this section, which it seemed impossible to get.

The American Pipe & Shipbuilding Co., Seattle, is preparing to build a new plant after Aug. 1. and the West Coast Shipbuilding Co., Everett, Wash., is reported to have received a \$2,000,000 contract for concrete ships.

William Cornfoot, president Albion Iron Works, Astoria, Ore., has purchased a frontage of 2500 ft. on Young's Bay, and it is reported will erect a steel shipbuilding plant on the site.

The Special Foundry & Machine Works, Portland, has been organized by Dr. E. G. Clark as president; W. E. Ramsey, vice-president; Paul H. Stroatt, secretary-treasurer, and F. J. Price, director. The new foundry will supply the market with medium and light weight castings and has installed its machinery. The plant will be in charge of Gust Staneberg, for many years with the National Tube Works and Peters Pump Co., Kewanee, Ill.

The Willamette Pattern Works, Portland, has been moved to larger quarters on East Water Street and considerable new machinery installed.

The Northwest Steel Co., Portland, Ore., has increased its capital stock from \$200,000 to \$1,000,000.

The McEachern Shipbuilding Co., Astoria, Ore., announces the enlargement of its plant on Young's Bay by the addition of a machine shop.

The Patterson-McDonald Shipbuilding Co., Seattle, recently purchased the plant of the Joseph Silver Machine Works, Salt Lake City, and will move the equipment to Seattle. Additional machinery has been purchased, to be installed in the machine shop. The company manufactures its own engines and other ship machinery, but obtains boilers from other sources. A boiler shop and a steel shipbuilding plant at the present wooden yards are under consideration. James Black is president and Adam Patterson, Jr., secretary and treasurer.

It is persistently rumored that a large steel plant will be built in Portland, Ore., with C. C. Overmire, formerly with the United States Steel Products Co., at the head of the enterprise. It is stated that \$1,500,000 has been subscribed by Portland capitalists and that the plant will cost \$3,000,000. The project has no connection with the Pacific Coast Steel Co.

It is reported that the Todd Drydock & Construction Corporation, Tacoma, Wash., has received contracts for 12 additional 7500-ton ships which will necessitate the expenditure of about \$15,000,000. Following the visit of Director-General Schwab the decision was made to extend the plant to eight ways and to install boiler and engine works, foundries and a large machine shop.

The Willamette Brass Foundry, Portland, has completed plans for a new plant, the main building to be 50 x 90 ft., and cost about \$3,500, exclusive of equipment.

The Rands Iron Works, Vancouver, Wash., is having plans prepared for a one story brick and steel foundry, 30 x 81 ft., adjoining the present plant.

The Vulcan Mfg. Co., Seattle, plans extensions to its plant costing \$15,000, which include additions to the foundry and machine shop, and the construction of a 350-ft. trestle. A craneway will also be built.

The Mechanical Products Co., Portland, contemplates the immediate construction of a plant to manufacture iron valves and heavy forgings.

Work has been started on the proposed foundry and machine shops to be built by the Northwest Motor Co., Seattle. It will manufacture steel castings and the initial expenditure will be \$150,000.

The Cummings-Moberly Lumber Co., Tillamook, Ore., has started work on construction of a sawmill nearby to have a daily capacity of 100,000 ft.

The Western Cooperage Co.'s plant at Portland was recently damaged by fire to the extent of \$30,000.

The Lyall Shipbuilding Co., North Vancouver, B. C., has received a contract for 24 wooden steamers of 3500 tons each.

The Municipal Appliance Co., Bozeman, Mont., recently incorporated for \$50,000, will manufacture illuminated traffic posts. Lester P. Work is at the head of the enterprise.

Canada

TORONTO, July 29.

The Ingersoll Machine Co., Ltd., Ingersoll, Ont., is building a new factory, 80 x 50 ft., and an addition to its present plant, 32 x 50 ft., at a cost of about \$60,000. New machinery will be installed.

The Ponliot Co., Bagotville, Que., will build a sawmill and roasting plant, to cost \$30,000, and is in the market for steam engine, pulleys, boilers, etc. R. E. Jaron, Chicoutimi, Que., is manager.

The London Hosiery Mills Co., Adelaide Street, London, Ont., will build a one-story brick boiler house at a cost of \$8,000. A. E. Nutter, Dominion Bank Building, is architect.

J. H. Ward, Fredericton, N. B., has the general contract for the construction of a brick addition to the plant of the Smith Brothers Foundry Co., King Street, Fredericton, at cost \$40,000.

Coaticook, Que., will build a one-story brick addition to its power plant to cost \$7,500. M. R. Cartier is secretary.

The Light and Water Commission, Newcastle, N. B., propose to erect an electric plant at a cost of \$125,000. J. E. T. Landon is clerk.

Lamontagne, Ltd., 338 Notre Dame Street West, Montreal, will build a power house at a cost of \$10,000.

The Ontario Furniture Co., Ltd., 367 Bleury Street West, Montreal, is in the market for equipment, including a double drum holsting engine, Ransome or Insley, concrete hoist bucket, six Ransome concrete buggies, concrete hopper gate, etc.

The Dominion Cannery, Ltd., will build a concrete boiler house at Vancouver, B. C., to cost \$60,000. A. E. Henderson is the architect.

The John Inglis Co., Ltd., has rented a foundry on Bathurst Street, Toronto, and will operate it in conjunction with its plant on Strachan Avenue.

The Shepard & Morse Lumber Co., Ltd., Ottawa, Ont., has been incorporated with a capital stock of \$2,000,000 by Philemon C. Walker, John G. Buchanan, James S. Chamberlin and others to manufacture ties, fence posts, etc.

The Domestic Engineering & Specialty Co., Ltd., Montreal, has been incorporated with a capital stock of \$20,000 by Louis A. David, Louis P. Crepeau, S. H. R. Bush and others to build, design and operate electric plants, water plants, etc., and to manufacture machinery and tools.

The Viking Corporation of Canada, Ltd., Toronto, has been incorporated with a capital stock of \$50,000 by Thomas H. Wilson, 506 Temple Building, Jacob W. Broudy, William R. Bird and others to manufacture electrical appliances, automobile accessories, machinery, tools, etc.

The International Munitions, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by James S. Lovell, 25 King Street West, Charles D. Magee, Ernest H. Stewart and others to manufacture munitions, machinery, tools, etc.

The Searchmont Lumber Co., Ltd., Searchmont, Ont., has been incorporated with a capital stock of \$100,000 by Gideon Grant, Bank of Hamilton Building, Andrew Doda, Mervil Macdonald and others to manufacture lumber, wood products, etc.

The National Abrasive Co. is removing its plant from Hamilton to Renfrew, Ont., owing to the large amount of power available. It has secured a site close to the Canadian Pacific and Grand Trunk railroad tracks and has awarded the contract for the erection of buildings.

The plant of the Peerless Pulp Co., Thorold, Ont., was destroyed by fire July 21, with a loss to building and machinery of \$200,000. It will be rebuilt.

The Great Northern Canneries Co., New Westminster, B. C., proposes to build a cooperage factory to cost \$60,000.

